RSR CORP
TXD079348397

CDM

environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.

1331 17th Street, Suite 1200
Denver, Colorado 80202
303 298-1311

June [illegible], 1992

Ms. [illegible] Henderson
Deputy Executive Director
Dallas Housing Authority
2525 [illegible] Drive
Dallas, TX 75219

Dear Ms. Henderson:

Enclosed please find eight copies of our report "Baseline Risk Assessment for Dallas Housing Authority". This report supercedes in all respects our previous preliminary draft report on risks due to lead exposure in DHA public housing in West Dallas.

Thank you for allowing us to assist you with your problems of lead contamination. I trust that this document will meet your needs in making decisions about the future of the West Dallas area. Feel free to call me with any questions about the report.

Please let me know if I and CDM can be of additional service in the future.

Sincerely,
CAMP DRESSER & McKEE

James M LaVelle

James M LaVelle, Ph.D.
Senior Toxicologist
(303) 298-1311

917603

Printed on recycled paper

TABLE OF CONTENTS

460\DHA\TOC.TXT
06/10/92 let

TABLE OF CONTENTS (Cont.)

LIST OF FIGURES

LIST OF FIGURES (Cont.)

LIST OF TABLES

460\DHA\TOC.TXT
06/10/92 lei

LIST OF TABLES (Cont.)

1.0 INTRODUCTION

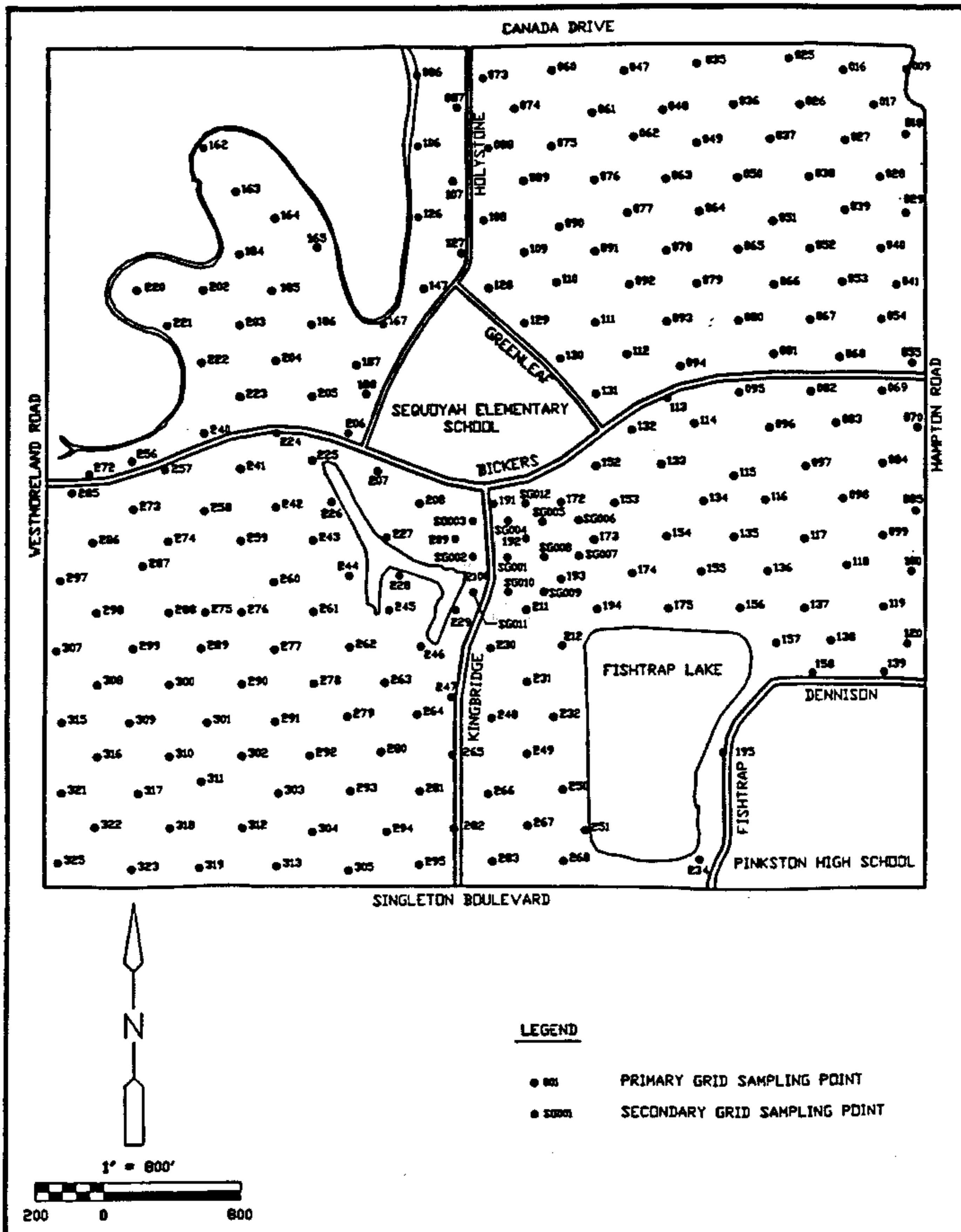
The Dallas Housing Authority (DHA) has commissioned Camp Dresser and McKee Inc. (CDM) to perform an investigative study of its West Dallas Development and to evaluate risks of adverse health effects to its residents. The West Dallas Development is a 460 acre area comprised of 3500 housing units and is the target of a revitalization plan being implemented by the DHA. The DHA West Dallas Site is bounded by Westmoreland Road to the west, Hampton Road to the east, Canada Drive and the West Fork of the Trinity River to the north and Singleton Boulevard to the south as shown in Figure 1-1.

The DHA's West Dallas Development has had a history of lead contamination which has generally been associated with the operations at the RSR facility located at the corner of Westmoreland Road and Singleton Boulevard. For many years, various organizations and regulatory agencies such as the Environmental Protection Agency (EPA) and the DHA have expressed concern regarding the degree of contamination currently at the West Dallas Development despite site cleanup activities conducted in the area in the mid 1980's.

A previous report, "Site Investigation at West Dallas Development-Status Report" (CDM 1992) identifies and delineates areas where contamination exists. The purpose of the present analysis is to use the data reported in the Status Report to quantify the potential for adverse health effects to residents of the West Dallas Development by developing a human health risk assessment. Furthermore, recommendations and rationale for cleanup levels at the site will be presented in this analysis.

1.1 SCOPE OF HUMAN HEALTH RISK ASSESSMENT

The overall approach to the human health risk assessment follows guidance provided in "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)" (USEPA 1989a). This document provides guidance on evaluating available data and identifying chemicals selected for quantitative analysis, developing exposure scenarios that depict expected exposure conditions and intakes, assessing toxicity of chemicals under expected exposure conditions,



CDM Dallas, Texas	Dallas Housing Authority Site	Primary and Secondary Grid Sample Locations	Figure No. 1-1

and combining this information to estimate health risks. In addition, site-specific exposure parameters are incorporated into this analysis.

Additional EPA guidance documents are used to evaluate potential adverse effects from exposure to lead. These include "Users Guide for LEAD: A PC Software Application of the Uptake/Biokinetic Model Version 0.40" and "Technical Support Document on Lead" (USEPA 1990a and b). Use of the Uptake/Biokinetic Model is discussed in Section 4.5 of this document.

1.2 UNCERTAINTY/SENSITIVITY ANALYSES

To perform a risk assessment it is necessary to make numerous quantitative assumptions regarding the type and extent of exposure that an individual may receive and the amount of exposure necessary to elicit an adverse health effect. There is some uncertainty associated with each estimated exposure value or toxicity criteria. In this risk assessment, uncertainties are addressed qualitatively in each major section of the report. A review of the uncertainties associated with many of the selected parameters indicates that the values selected tend to overestimate, rather than underestimate, exposure. Thus, the selected values are considered "conservative", or more likely to be over-, rather than underprotective for potential receptors.

Some exposure parameters or toxicity criteria have a greater numerical impact on the outcome of the risk assessment than others. The outcome of the risk assessment is considered to be more sensitive to these parameters or criteria. A sensitivity analysis is included in Section 4.6.3 which evaluates the impact of using average or maximum values of lead levels in tap water. In Section 7.0, a discussion of the impact of implementing a range of lead cleanup levels is presented.

2.0 SITE SETTING

2.1 SITE BACKGROUND

Based on a review of aerial photographs of the area, the area now occupied by the West Dallas Development was relatively undeveloped prior to 1942. An increase in the number of private residences occurred between 1942 to 1951. Prior to its current development, the West Dallas Site consisted mostly of privately owned residences. Industrial facilities were to the south of Singleton Boulevard. A 1958 photograph shows the site after development of public housing. This configuration is very similar to its present condition except for the strip mall presently at the corner of Singleton and Hampton. (Refer to maps for present condition).

Aerial photographs of the site also identify areas of excavation and, consequently, potential areas for past disposal of contaminated fill. During the period from 1942 to 1951, aerial photos indicate that excavation occurred in the area south of what is currently Bickers Street, on either side of Kingsbridge Street, and in the vicinity of West Lagoon. Aerial photographs also indicate excavation occurred at the northeast corner of Fishtrap Road and Dennison Street and along Hampton Road. The excavation was associated with sand and gravel mining, which was typical in the area. No evidence of excavation in the northeast of the site was apparent from the aerial photographs. This area of the site is a potential location for a new DHA office building.

The DHA's West Dallas Development has been the subject of concerns regarding human and environmental exposure to lead contamination dating back to the early 1970's. The primary focus of previous investigations was lead deposition on surrounding soils from the RSR smelter and use of smelter wastes (e.g., slag and battery chips) as fill material in local neighborhoods.

The RSR facility, a secondary lead smelter, was operated by various entities since it began operation in 1934 as Murph Metals. In 1971, RSR acquired the facility from Murph Metals. In 1975, RSR installed its tallest stack on the smelter and agreed to pay fines for pollution violations and install pollution abatement equipment. In September 1983, RSR sold the facility to Murmur Corporation pursuant to a divestment order from the Federal Trade Commission. The Murmur Corporation, which operated the smelter for less than a year, was closed due to its inability to secure an operating permit from the Dallas Board of Adjustment. The facility closed February 1984 and was legally prohibited from operating by a court order in February 1985.

In the mid 1980's, a court order mandated that RSR/Murph Metals conduct cleanup or remedial activities at the RSR smelter facility and surrounding area. Remedial activities have included a 40 acre area within a half-mile radius of the smelter including a 200 x 400 foot area at the Boys and Girls Club on Singleton Boulevard. The 40 acre area included both residential and public housing. For remedial purposes, this area was divided by EPA into Zone A and Zone B based on soil analytical results. Remediation of Zone A, which is just north of the smelter, required excavation of the top 6 inches of the soil and replacement with clean fill. Selected areas in Zone B, such as playgrounds, required removal of surface soil and replacement with clean fill. Excavated soil was classified as Class II industrial waste and transported to the Pleasant Run Road disposal facility near Wilmer, Texas. The City of Dallas was made the responsible party for maintenance and monitoring of this facility for the next 30 years. The 1900 cubic yards of soil excavated from the Boys and Girls Club property was classified as hazardous waste based on extraction procedure (EP) toxicity testing. The soil was, therefore, transported to a Class I hazardous waste landfill in Robstown, Texas for disposal.

Even after the cleanup activities of the mid 1980's, there has been continued public concern about lead contamination that may still exist in and around the West Dallas Development. There have been several studies conducted since the mid 1980's to assess potential environmental contamination and human health concerns (e.g., blood levels of lead in children).

In a 1982 study (Von Lindern), nearly 14 percent of the children residing within a one-mile radius of the smelter had blood lead levels exceeding 25 μg/dL, the level Center for Disease Control (CDC) associated at that time with lead toxicity. Average blood lead levels within a half-mile radius of the RSR smelter were 20.1 μg/dL.

According to the 1982 study, paint was dismissed as a significant source of lead to children in this area. Soil and air lead levels were determined as the predominant sources of excess absorption. Principal sources of this lead were the RSR smelter and high traffic density on area streets. Their relative contributions to blood lead were estimated as 90 and 10 percent respectively.

Blood screening of individuals (children and pregnant women) as conducted in 1984 as a result of a court order mandating remediation of RSR soil. The results of this study are similar to the 1982 study.

2.3 FISHTRAP LAKE STUDIES

Fishtrap Lake and West Lagoon, which are located at the West Dallas Development, have been the subject of two previous studies conducted by Terra-Mar, Inc. (1987) and Carter & Burgess/ WAPORA, Inc. (1985). Fishtrap Lake covers approximately 21.2 acres and has a maximum depth of 6 feet. It is located in the southeast corner of the development area and is a storage area for local stormwater runoff. The West Lagoon, located south of Bickers street and west of Kingbridge Street, serves as a stormwater retention pond in which rain water runoff collects and also accepts overflow from Fishtrap Lake and ultimately routes the water to the Trinity River.

In the Carter & Burgess/WAPORA, Inc. study entitled, *LAKEWEST-Fishtrap Lake Analysis*, sediments, water and fish tissues of Fishtrap Lake and the West Lagoon were sampled. Several parameters were measured such as fecal coliform, dissolved oxygen, biological oxygen demand, and metals (e.g., lead, cadmium, chromium, copper, mercury, nickel and zinc). All fish tissue and water samples were within the acceptable limits based on reference data for these media.

All sediment samples were analyzed for total lead, while priority pollutant metals were analyzed in only one sample from both the lagoon and lake. Sediment samples were taken from 10 locations in the lake and one location of the lagoon as shown in Figures 4-5 and 4-6. At each location, sediment samples were taken from various depths (6 inches, 12 inches, 18 inches and 24 inches) resulting in a total of 24 samples collected. Lead content in the surface samples ranged from 12.1 to 1470 mg/kg. Tissue samples from four species of fish were also collected and analyzed for lead content. Lead concentrations were all below analytical detection limits (the highest limit of detection was 0.1 mg/kg). The report concludes that fish caught from the lake do not pose a hazard to humans based on comparison with lead concentrations in "fish market canned fish" (Appendix A, p. 18).

Current recreational facilities at the lake include concrete walkways and picnic tables. Tall weeds around the periphery of most of the lake present a physical barrier. Therefore, the lake is commonly inaccessible from the shore. The Carter Burgess/WAPORA (1985) report is attached as Appendix A.

3.0 DATA EVALUATION

This section discusses the sampling data available for use in this analysis and methods used to select chemicals for quantitative evaluation. The purpose of this process is to ensure that only those chemicals that may be attributable to the RSR facility and that are likely to contribute to risk based on potential for release and on toxicity are carried through the risk assessment process.

Section 3.1 presents a summary of sampling data. Section 3.2 discusses areas of unusually high lead levels. Contaminants of concern are identified in Section 3.3. Background levels of lead and arsenic are discussed in Section 3.4, and uncertainties are presented in Section 3.5.

3.1 SUMMARY OF SAMPLING DATA

Samples for analysis were collected from various areas of the DHA site from the following media: surface and subsurface soils, indoor dust, tap water, and ground water. Surface soil samples were collected along a 300 foot grid pattern to a depth of 18 inches. Soil samples were tested for lead, arsenic, and cadmium, since these are contaminants historically identified with smelting processes. Dirt and tap water samples were collected at random, but were taken from units representative of both occupied and unoccupied status. First draw tap water (e.g., water that had been standing in the pipes) was sampled for lead and copper, contaminants that commonly leach from deteriorating plumbing (see Section 4.5.2.2 for results). Methods for sample collection, processing, analysis, and verification entailed rigorous protocols which are discussed in detail in the report titled, "Site Investigation at West Dallas Development Status Report," (CDM 1992). Validated sampling results from surface and subsurface soils were entered into a database to allow various statistical analyses. In addition, historical data collected from air monitors around the area of concern were entered into a database. These data, collected by the City of Dallas from the early 1970s to 1991, are discussed in Section 4.4.3.

In general, soil lead concentrations are highest in the southwest corner of the West Dallas Development and decrease in the northeast and east directions. Also, lead concentrations tend to be highest in the 0-1 and 1-2 inch depth intervals and decrease with increasing depth. The shallower sampling depths are likely indicative of surface deposition (e.g. from a smelter), while deeper samples are more likely to represent contaminated fill. Results of the soil sampling are discussed in Section 4.5.2.1. A complete listing of soil samples, including sample results for all grid locations in the primary grid (PG) and secondary grid (SG) samples, may be found in "Site Investigation at West Dallas Development-Status Report" (CDM 1992).

3.2 AREAS WITH HIGHEST LEAD LEVELS

Four areas of the site were found to have relatively high lead concentrations (greater than 500 to 1000 mg/kg). These areas include:

- Grid locations PG-210 and SG-11 — west of the intersection of Kingbridge and Morris (approximately 5000 and 1000 mg/kg, respectively);
- Grid locations PG-286 and PG-275 — south of Bickers near Delhi and Baker Streets (approximately 1000 mg/kg, each);
- Grid location PG-325 — in front of the Boys and Girls Club on Singleton (approximately 1000 mg/kg); and
- Grid locations PG-311 and PG-312 — at the intersection of Toronto and Pointer (approximately 600 and 700 mg/kg, respectively).

All grid locations for primary and secondary samples are shown in Figure 1-1.

3.3 CONTAMINANTS (METALS) OF CONCERN (COCs)

CDM has sampled the site for lead, arsenic, and cadmium. These metals are the most likely to be of concern due to their toxicity. Most of these samples did not have detectable levels of either arsenic or cadmium, whereas virtually all samples had measurable levels of lead, many of which exceeded values considered as background for the Dallas area. According to the EPA, background soil lead levels in the Dallas area are 80 to 90 mg/kg (Ross 1992). CDM sampling in two off-site areas, Forest Green Manor and Audelia Manor, indicated arithmetic mean averages of 35 and 64 mg/kg, respectively. Samples in which cadmium was detected generally had levels of 1 to 2 ppm. Measurable levels of arsenic showed much more variability, but were consistently much lower (usually by more than an order of magnitude) than levels of lead in the same sample. These results indicate that lead is the primary metal of concern. This metal is, therefore, the only COC and is the focus of this report.

A screening (worst case) characterization of risk from potential exposure to arsenic was performed based on a soil ingestion pathway. CDM on-site sampling data were used for this analysis. A conservative detection limit for arsenic of 10 ppm for the XRF method was assumed, since a detection limit for arsenic by this method has not been quantified. Many of the samples did not contain measurable levels of arsenic, but were conservatively assumed to contain one-half of the assumed detection limit, or 5 ppm. Analysis of these data indicated a 95 percent upper confidence limit on the geometric mean of 5.6 ppm arsenic. As indicated in Section 3.4.2, this arsenic level is essentially the same as the estimated natural background for arsenic in the western United States.

If one assumes that this level of arsenic is present on-site and that an individual might ingest 100 mg of soil per day for a lifetime, a conservative upper bound on potential cancer risks may be estimated as follows:

$$\frac{IR \times CS}{BW} = Risk = 1.4 \times 10^{-5}$$

Where: IR = ingestion rate (100 mg/day)
CS = chemical concentration in soil (parts per 10^6)
SF = oral slope factor for arsenic (1.75 $(mg/kg/day)^{-1}$, pending)(USEPA 1991b)
BW = body weight (70 kg)

Given the inherent conservatism in this analysis, the actual risk is unlikely to be greater, and likely to be less than that estimated. The estimated risk is within an order of magnitude of the EPA benchmark risk of 1×10^{-6}, and EPA has advised risk managers that arsenic risks from ingestion may be revised downward by an order of magnitude due to uncertainties in current knowledge of arsenic metabolism (USEPA 1991a). Clean-up levels at Superfund sites have recently been set at levels of 70 to 100 mg/kg for arsenic in residential soils (USEPA 1990c). Arsenic does not appear to be of concern for the DHA property.

3.4 <u>BACKGROUND LEVELS OF LEAD AND ARSENIC</u>

3.4.1 BACKGROUND LEVELS OF LEAD

Background levels of lead in soil vary widely from place to place because the primary source of lead in the environment is anthropogenic emissions to the atmosphere (ATSDR 1990). Soil derived from crustal rock generally contains < 10 to 30 mg lead/kg soil. Shacklette and Boerngen (1984) collected surficial soil from the conterminous United States and reported that the geometric mean levels for all samples was 16 mg/kg, while for the western United States the level was slightly higher (17 mg/kg). In contrast, studies of urban areas in Maryland and Minnesota indicate that these areas have soil lead levels from 20 to 700 mg/kg mostly due to anthropogenic sources (ATSDR 1990).

3.4.2 BACKGROUND LEVELS OF ARSENIC

Levels of arsenic in soil are also variable, with content of virgin soils reported between 0.1 and 80 mg/kg and averaging about 5 mg/kg (ATSDR 1989). The reported value in soils from the conterminous United States was 5.2 mg/kg, and from the western United States, 5.5 mg/kg. Both of these values are geometric means (Shacklette and Boerngen 1984). These background levels are similar to that estimated for the average arsenic concentration in the DHA area. There is no indication that arsenic levels are significantly elevated.

3.5 <u>UNCERTAINTIES</u>

USEPA (1989a) states that only those chemicals that can be attributed to site-related activities, that are present at levels elevated above background and that are significantly toxic at the observed concentrations, should be evaluated in a risk assessment. Although the available data for background levels of lead in West Dallas are limited, there is no doubt that some areas of the DHA West Dallas Development site exceed background levels.

Site-specific data for background levels of arsenic are nonexistent. Levels of arsenic measured onsite, however, are generally quite low and similar to regional background estimates. It is unlikely that arsenic concentrations in soil are significantly elevated and contribute to potential risk of adverse effects.

4.0 EXPOSURE ASSESSMENT

Exposure assessment is an evaluation of possible exposed populations and of the magnitude, frequency, duration and routes of exposure. The objective of this exposure assessment is to evaluate a reasonable maximum exposure (RME) that may occur in a population at the DHA site as a result of exposure to lead. An RME is defined by USEPA (1989a) as the highest exposure that is reasonably expected to occur at a site. To achieve conservative yet realistic exposure estimates, a combination of upper range (e.g., 95th percentile) and average values for exposure parameters are combined to estimate an exposure in the upper range of those possible.

In this chapter the demographics of the DHA site and adjacent areas are discussed in Section 4.1. In Section 4.2 a site conceptual model is presented depicting potential exposure pathways and receptors. Section 4.3 discusses potential exposure pathways and indicates those that will be quantified. Section 4.4 identifies receptors for which exposure will be quantified. Use of the Integrated Uptake Biokinetic Model to quantify exposure is discussed in Section 4.5.

4.1 AREA DEMOGRAPHICS

4.1.1 GENERAL POPULATION CHARACTERISTICS

Portions of three different federal census tracts are included in the DHA site. Census information from the 1990 census indicates the following concerning the populations in these tracts:

- A large majority of the housing units are rentals and the vacancy rate is very low;
- The majority of households are families;
- The largest age group is 5 to 17 years old (average 32 percent of the population); and
- An average of 11 percent of the population is under 5 years old, with 264 children under age 5 in tract 102, 21 in tract 103, and 292 in tract 104. In adjacent tracts 101.01 (east of the site) and 105 (west of the site) there are 311 and 203 children, respectively, in this age group.
- [Numbers of women age 18-45 (child-bearing age) in 102, 103, and 104.]

4.1.2 SUBPOPULATIONS WITH POTENTIAL FOR HIGH EXPOSURE

Children under the age of 6 are considered the most sensitive to the toxicological effects of lead (see Section 5). The behavior of young children, including the propensity for hand to mouth activity, is expected to increase exposure in this age group. Young children will ingest soil and dust particles clinging to hands, toys, and other objects that are mouthed. Further, children are physiologically more susceptible to lead exposure. They tend to absorb much more of the lead which is ingested, and their developing nervous systems appear more sensitive to neurologic damage.

For these reasons, children are considered the most important receptors for lead exposure. Because over 500 young children are likely to live in DHA housing (Section 4.1.1), children are the primary focus of this risk assessment. Protection of this subpopulation is expected to also protect older children and adults.

Specific populations of young children living in DHA housing may be at higher risk. Because of the large numbers of children expected in this area, it is reasonable to define specific exposure units based on probable differences in potential for lead exposure (Section 4.5.2.1). By considering such subpopulations, the risk assessment avoids underestimating risks for part of the population by averaging their exposures in with those of other children less at risk.

Further, a day care facility in the northeast corner of Area 3 is still in use, with an enrollment of approximately 50 children up to the age of 3 years. The area around the facility has been sampled, with highest nearby soil lead measurements of approximately 535 and 565 mg/kg (CDM 1992). If children were exposed to these soils, particularly in a playground setting, there would be the potential for increased blood lead levels. Grounds of the facility have also been tested for soil lead, and the EPA states that playground soil does not exceed soil lead levels above background. The facility, however, is not fenced and there is the potential that a child could encounter contaminated soil. CDM personnel that are often at the DHA site indicated that the facility is within 75 feet of CDM soil sampling grid point 258, with soil lead levels of 535 mg/kg. It should be noted that the day care facility plans to close in the fall of 1992, due to potential plans to tear down and rebuild this portion of the DHA site (Whitehead 1992).

4.2 SITE-CONCEPTUAL MODEL

Figure 4-1 is a site conceptual model developed for the DHA site, showing potential exposure pathways and receptors. Only those pathways expected to be complete, however, are considered quantitatively. These pathways are highlighted in red in Figure 4-1.

An exposure pathway is considered complete if there is a chemical source, a method by which the chemical is released to the environment, an environmental transport medium such as water or air, a point of potential contact between a receptor and the contaminated medium, and an exposure route at the contact point.

4.3 EXPOSURE PATHWAYS

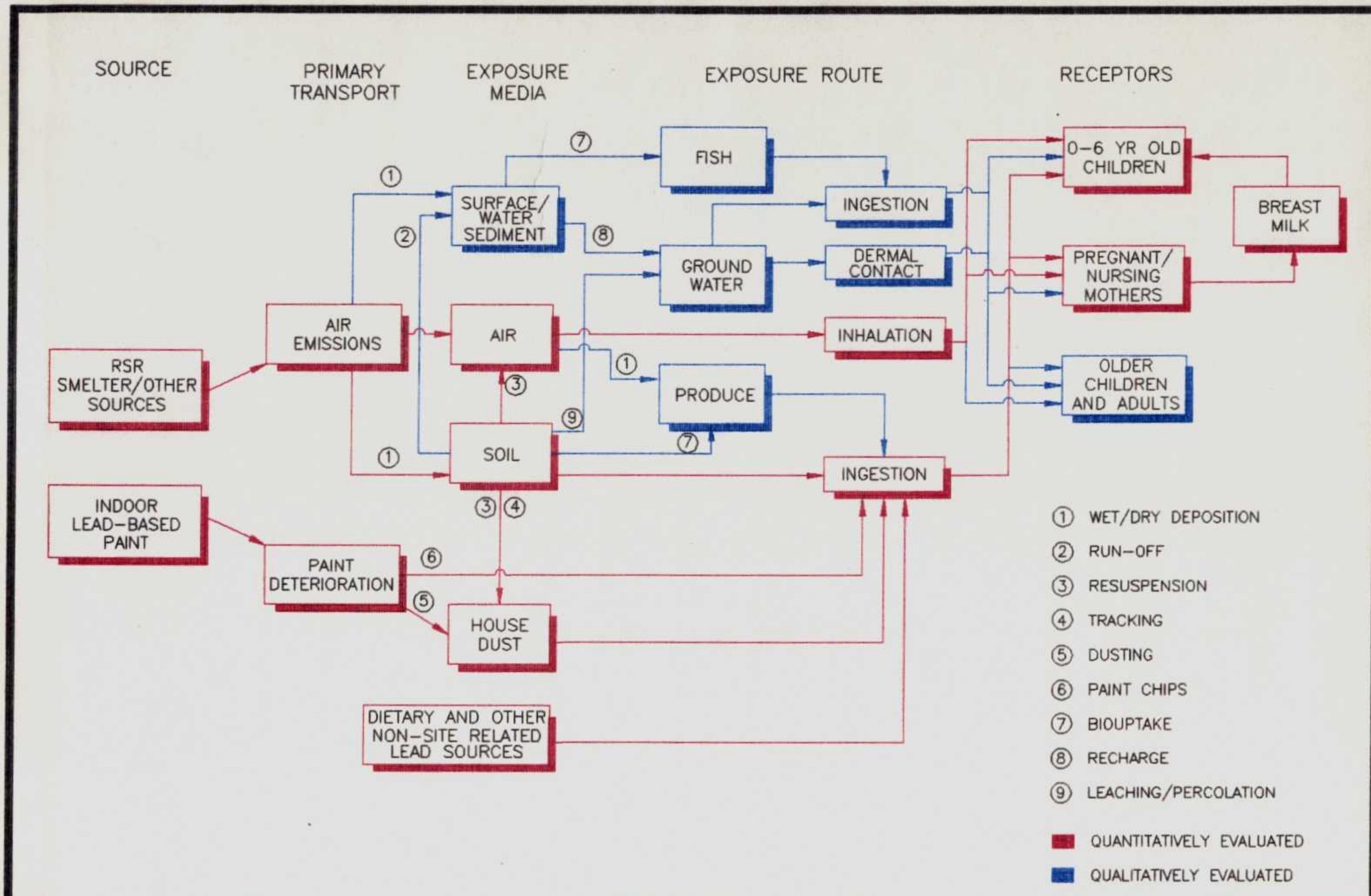
4.3.1 INHALATION OF AMBIENT AIR AND DUST

Lead released directly to the air by currently existing emission sources or resuspended from contaminated soils is available for inhalation by individuals in the area. Lead in soil may be resuspended as particulates in air by wind erosion or pedestrian/vehicular traffic. Lead inhalation, both indoors and outdoors, is a complete pathway which is quantitatively evaluated for infants and children. In figure 4-1, this pathway is traced from the source, through the primary transport mechanism (air emissions), to receptors (young children) via inhalation.

4.3.2 INGESTION OF SOIL, DUST, OR PAINT CHIPS

Historically, air-borne lead emissions from the RSR Smelter, from auto exhaust, and possibly from other sources, have been deposited onto soils in the DHA public housing areas. Because of the immobility of lead in soil, much of this lead has remained in these areas at or near the soil surface (CDM 1992).

Incidental ingestion of lead contaminated soil and dust is a significant route of exposure, especially for young children who are the most sensitive target population. Children may ingest contaminated soil or dust by normal mouthing of soiled objects or their hands (Mahaffey 1978, Schaum 1984). Adults



CAMP DRESSER & McKEE INC.

CDM

FIGURE 4-1

DHA SITE CONCEPTUAL MODEL

may inadvertently ingest contaminated soil during activities such as gardening, and may ingest dust while engaged in general household activities. This pathway can be traced from air emission to soil via wet/dry deposition, and to receptors via incidental ingestion (Figure 4-1).

In addition, particularly in older homes, wall paint may be contaminated with lead. As this paint deteriorates, it chips and thus becomes available for ingestion, particularly by young children. Deteriorating paint also contributes to the amount of lead in house dust. Ingestion of soil, dust, or paint chips is quantified as an exposure pathway. The DHA site and adjacent neighborhoods were developed in the early 1950s. It is likely, therefore, that paint used in these units was lead based and that exposure may occur by this route (ATSDR 1990). The paint pathway is depicted separately from smelter emissions from the paint source in the home through housedust and to receptors via incidental ingestion (Figure 4-1).

4.3.3 NORMAL DIETARY CONSUMPTION

Lead is ubiquitous and may be introduced into dietary items by numerous methods including atmospheric deposition, treatment with lead-based pesticides, and leaching from containers during packaging and handling. Based on data from studies of food consumption patterns and lead levels in various foods, the USEPA and FDA have established reference values for lead contents of typical diets for children and adults (USEPA 1986a). Therefore, exposure via this route is quantified for the target populations, to ensure that baseline lead exposures are included in the assessment. Dietary lead is considered a non-site related source and is included in Figure 4-1 as a separate exposure media.

4.3.4 CONSUMPTION OF FISH, GROUNDWATER, AND HOMEGROWN PRODUCE

Historically, sediments in Fish Trap Lake may have been contaminated with lead by direct deposition of air-borne contaminants or by run-off from adjacent contaminated soils. Fish may accumulate this lead through direct uptake from surface water and sediments. On-site monitoring indicates, however, that fish from the local lake contain very low levels of lead (all below analytical detection limits of 0.1 mg/kg wet weight) (WAPORA 1985). This indicates that lead in fish from the lake occurs at lower levels than those assumed for general dietary concentrations (0.1 ppm) used in this assessment. Therefore, this exposure pathway is considered incomplete. The biokinetic model used in this analysis includes default values for lead levels in food. These are discussed in Section 4.3.2.3. A sensitivity analysis assuming ingestion of local fish is presented in Section 6.4. The fish pathway can be traced in Figure 4-1 from air emissions, to surface water/sediments, to fish, to receptors via ingestion.

Produce may become contaminated as explained in Section 4.2.3, or by uptake of lead from contaminated soils. On-site observation has indicated that the area of concern is not conducive to large-scale gardening and no such gardens have been observed. In addition, the DHA actively discourages vegetable gardens (Henderson 1991). Homegrown produce is not expected to be a significant part of the diet and consumption of homegrown produce will not be quantified as an exposure pathway. The produce pathway is illustrated in Figure 4-1 starting with air emissions, followed by deposition directly onto plants or onto garden soil with subsequent plant uptake. Receptors are exposed by ingesting produce.

Because on-site sampling of groundwater has shown that lead levels are quite low (less than the detection limit of 20 μg/L), and because all residents are connected to city water, on-site groundwater will not be considered as a drinking water source for this assessment. The pathway is incomplete both due to the apparent lack of leaching of lead from surface and subsurface soils to groundwater and because the shallow aquifer is not used for drinking water. The groundwater pathway is traced from air emissions, to soil by deposition, to groundwater by leaching and to receptors via ingestion of groundwater (Figure 4-1).

City water does, however, contain small amounts of lead, and additional lead could be leached from water pipes soldered with lead-containing solder. This could be a significant source of lead exposure and is quantified. This pathway is not specifically shown in Figure 4-1, but is instead included in dietary and related sources.

4.3.5 DERMAL ABSORPTION THROUGH CONTACT WITH SURFACE OR GROUNDWATER OR SOIL AND DUST

The extent of any absorption of lead across the skin would be dependent on the concentration of lead in the water and the absorption rate of lead through the skin. The level of lead in surface and groundwater is very low, less than 1 and 20 μg/L, respectively (WAPORA 1985 and CDM 1992). In addition, inorganic lead in solution is very poorly absorbed through the skin (0 to 0.3 percent of administered dose) (USEPA 1990b). Absorption from soil and dust can be expected to be even lower. Exposure via this pathway is thus unlikely to be significant and will not be quantified. This pathway follows those for surface and groundwater contamination, then traces to dermal contact with contaminated water as a route of exposure (Figure 4-1).

4.4 POTENTIAL RECEPTORS

An increasing body of evidence suggests that young children (0 to 6 years of age) are particularly susceptible to adverse effects following chronic, low-level exposure to lead. These effects, primarily neurological, are associated with both pre- and postnatal exposure and include mental deterioration, aggressive behavior, sleeping difficulties, and lack of motor coordination or sensory perception (Tsuchiya 1986). Moreover, large numbers of young children currently live in DHA housing (Section 4.1.2). Therefore, young children are identified as potential receptors for lead exposure in this analysis.

Maternal exposure to environmental lead has been associated with increased lead in cord blood and the placenta (Sager et al. 1986). In addition, there is good correlation between lead concentrations in the blood of mothers and neonates indicating that there is only a slight barrier for placental transfer of lead (Tsuchiya 1986). The large numbers of women of child bearing age currently living in DHA housing (Section 4.1.2) suggest a potentially large neonate population at risk from exposures via maternal blood lead. Therefore, the neonate receiving lead via placental transfer is a potential receptor in this analysis.

4.5 THE INTEGRATED UPTAKE BIOKINETIC MODEL FOR LEAD

4.5.1 APPLICATION OF THE INTEGRATED UPTAKE BIOKINETIC (IUBK) MODEL

Empirical data suggest that the threshold for noncancer effects of lead in infants and young children may be very low or non-existent (USEPA 1984 a,b). EPA has declined, therefore, to develop an oral reference dose (RfD) for lead since an RfD is based on identification of a no observable adverse effect level (NOAEL) for a particular chemical and endpoint. Blood lead levels however, have been correlated with subtle neurotoxic effects and provide a useful biological marker of exposure and potential health hazards (see Section 5.2). The Office of Air Quality Planning and Standards (OAQPS) has developed a model (USEPA 1990a) that allows prediction of blood lead levels as described below. Development of the computer implementation of the model is under the direction of the USEPA Environmental Criteria and Assessment Office (ECAO).

The purpose of the Integrated Uptake Biokinetic Model (IUBK model) is to estimate age-specific blood lead levels associated with total lead uptake in children from intake via diet (in foods and water), inhalation and ingestion of soil, dust, and paint (USEPA 1990a and b). The model focuses on blood lead levels in 0 to 6 year old children because they are the receptors most vulnerable to the neurotoxic effects of lead which may occur at low chronic doses (see Section 4.3). The model also accounts for blood lead which may be transferred from a mother to a fetus across the placenta. The IUBK model utilizes site-specific data and/or default values for lead levels in each medium. This information, when combined with information on behavioral and physiologic parameters, may be used to estimate rates of lead uptake into the blood (USEPA 1990b).

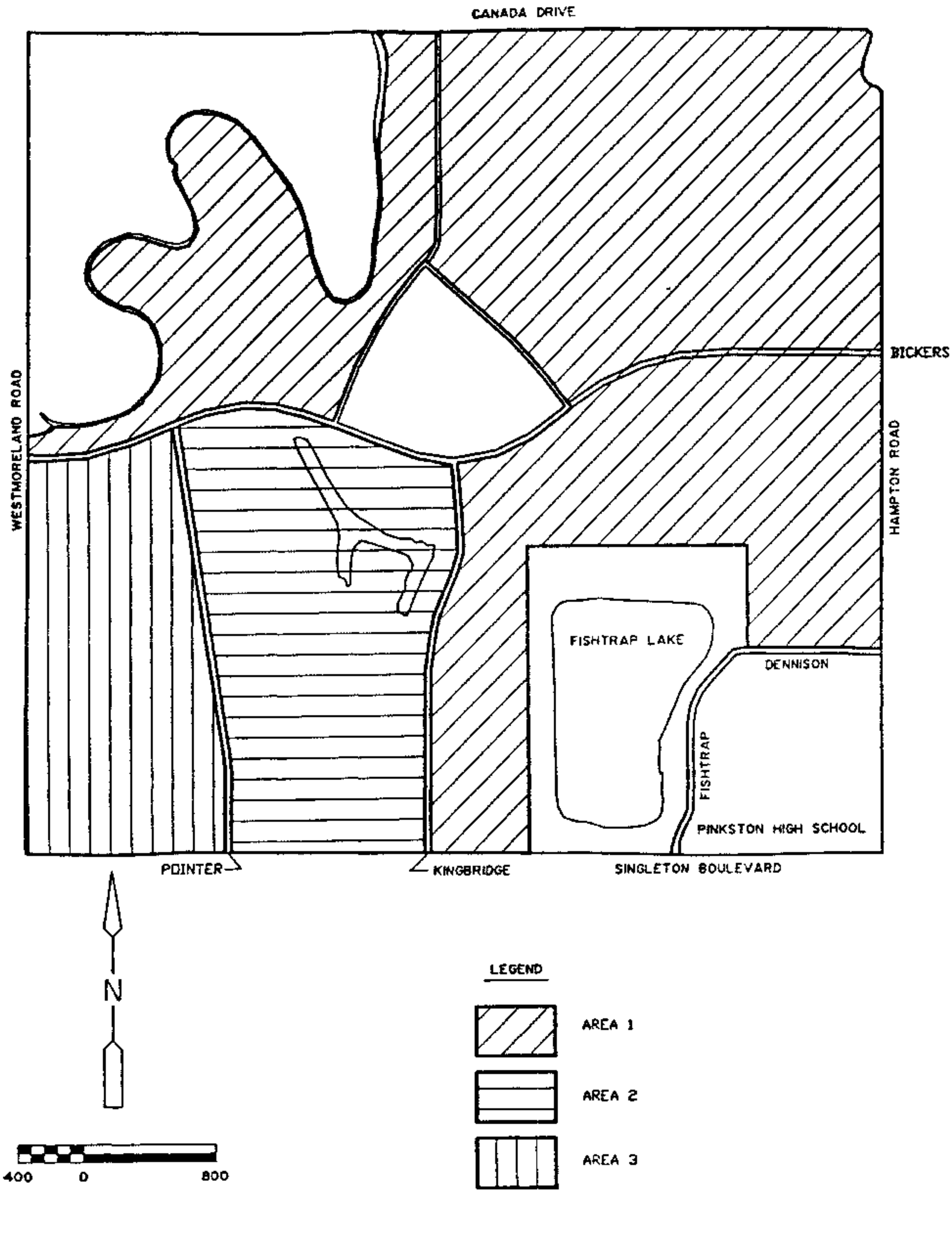
4.5.2 INPUTS TO THE IUBK MODEL/EXPOSURE POINT CONCENTRATIONS

4.5.2.1 Lead Levels in Dust and Soil

The most desirable input is that obtained from adequate site sampling data. "Adequate" infers that data are sufficient to derive reasonable estimates for the long-term average concentrations of lead at places where human contact is likely. The model accounts for exposure via outdoor soil, as well as indoor dust. If indoor levels are not available, the outdoor levels may be related to indoor levels by an empirically derived conversion factor (USEPA 1990a). Although transport of lead from outdoors to indoors may account for much indoor air lead, the transport processes are complex and vary from site to site.

Soil

To facilitate analysis of soil exposure point concentrations, the DHA site was divided into three distinct areas, shown in Figure 4-2. Area 1, farthest from the source, is east of Kingbridge and north



CDM *Dallas, Texas*	Dallas Housing Authority Site	**Areas of the DHA Site Used for Estimation of Exposure Point Concentrations**	Figure No. 4-2

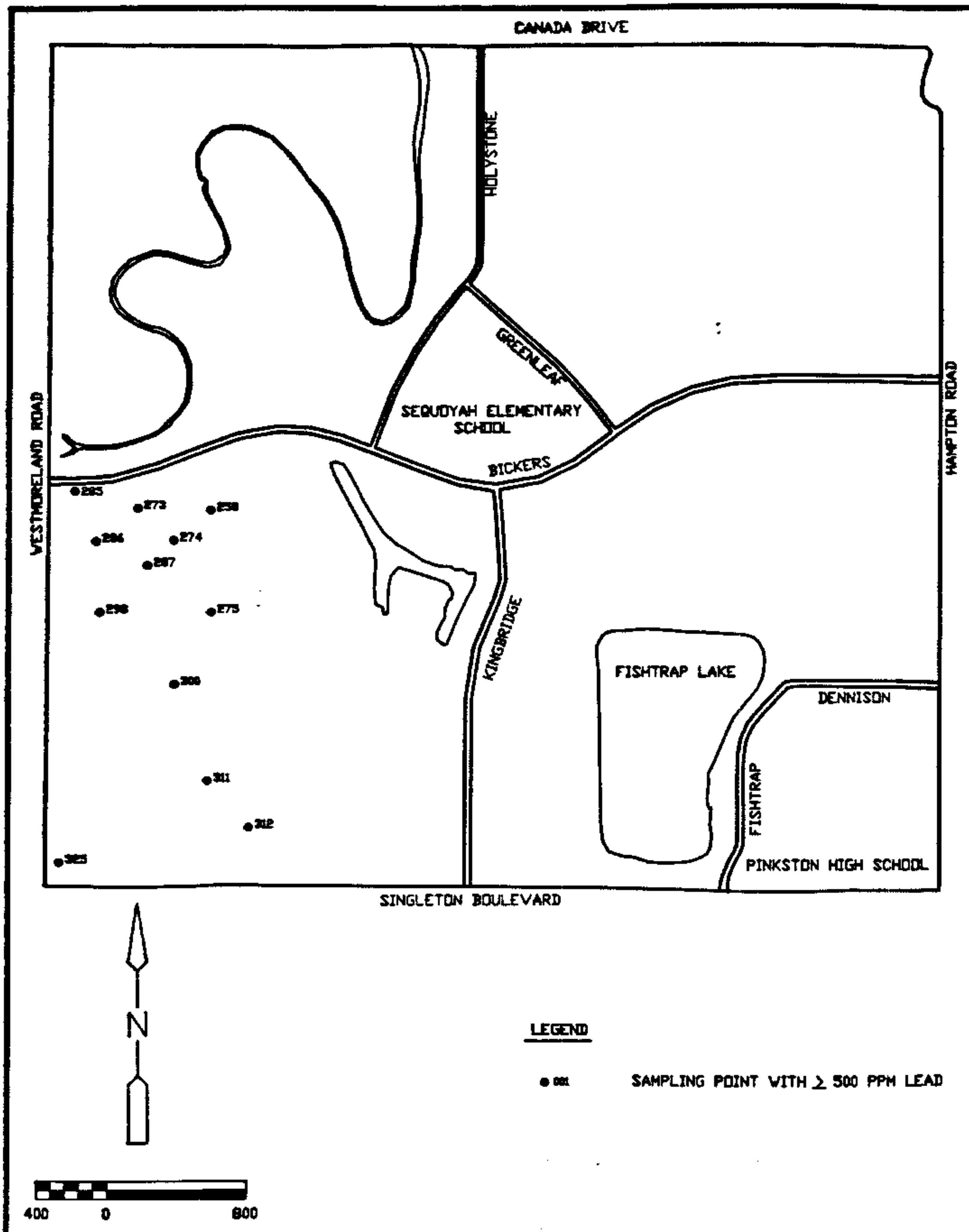
of Fishtrap Lake, and otherwise bounded by the site boundaries. Area 2 is bounded by Singleton Boulevard (south), Pointer (west), Bickers (north) and Kingbridge (east). Area 3, which is nearest the RSR facility, is bounded by Singleton (south), Westmoreland Road (west), Bickers (north) and Pointer (east). These divisions were made on the basis of occupied vs. unoccupied areas, locations thought to have received greater impact from the smelter and convenient local boundary features. The divisions may be taken as subareas which differ significantly in terms of lead exposures. Within a given subarea, exposures are believed to be relatively homogeneous.

Using log transformed grid point sampling data for each area, the geometric means and 95 percent upper confidence levels for soil at a depth of 0 to 1 inch were determined. Surface contamination is judged most appropriate for assessing current exposures; however, comparative analyses are also included using sampling data from 1 to 2 inches and 2 to 6 inches. These sampling data and comparative analyses are listed in Appendix B.

The 95 percent upper confidence levels of soil lead in 0 to 1 inch samples were used in the model to predict blood lead levels for 0 to 6 year olds in each area. A dual analysis of Area 3 data was performed due to the large variability in the data. Of 36 total soil samples in the 0 to 1 inch range, 12 exceeded 500 mg lead/kg. Locations of these sampling points are illustrated in Figure 4-3. These higher level samples, clustered primarily in the northern portion of the area (all of which is fenced and uninhabited), resulted in a geometric mean soil level that was higher in this subarea and not a reflection of potential exposure concentrations in the area as a whole. Therefore, an analysis of soil sampling data using soil levels of 500 mg/kg or less was performed (referred to as 3a), as well as an analysis of those soil levels exceeding 500 mg/kg (referred to as 3b).

Tables 4-1 to 4-4 provide soil data included in exposure point concentrations for each area. Figures 4-4 to 4-7 show normal probability plots for log transformed soil lead levels used in the model. Plots that approximate a straight line indicate a log normal distribution. Exposure point concentrations used are provided in Table 4-5.

In Area 1, the exposure point concentration is 93 mg/kg, with a range of values from 15 to 241 mg/kg. Only two values exceed 150 mg/kg. The upper confidence limit on the geometric mean and range of values is similar to that expected for urban background. It appears that this area of the site



CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Sampling Points in Area 3 Exceeding 500ppm Lead**	Figure No. **4-3**

TABLE 4-1

ANALYTICAL RESULTS - PRIMARY GRID SURFACE SOIL SAMPLES - 0 to 1 INCH
DALLAS HOUSING AUTHORITY - AREA 1

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
AREA 1									
PG-009	164	PG-049	35	PG-081	44	PG-114	51	PG-154	36
PG-016	44	PG-051	85	PG-083	20	PG-115	21	PG-155	41
PG-017	15	PG-053	49	PG-085	120	PG-116	44	PG-157	61
PG-018	141	PG-055	150	PG-087	74	PG-117	27	PG-163	67
PG-025	36	PG-060	41	PG-088	73	PG-118	64	PG-165	73
PG-026	109	PG-061	36	PG-090	99	PG-120	72	PG-172	60
PG-027	54	PG-062	55	PG-092	41	PG-127	49	PG-173	68
PG-029	75	PG-064	49	PG-094	45	PG-130	61	PG-185	54
PG-035	41	PG-068	87	PG-096	57	PG-133	27	PG-187	80
PG-036	84	PG-070	85	PG-097	66	PG-135	52	PG-188	145
PG-037	50	PG-073	52	PG-098	53	PG-136	138	PG-191	61
PG-039	75	PG-074	52	PG-100	126	PG-137	41	PG-192	35
PG-041	47	PG-075	68	PG-108	47	PG-138	123	PG-193	102
PG-047	41	PG-077	74	PG-110	59	PG-147	73	PG-195	45
PG-048	65	PG-079	52	PG-112	60	PG-153	2	PG-202	93

460\DALLAS HOUSING\TABLES\4-1.tbl
6/10/92 mm

TABLE 4-1 (Cont.)

ANALYTICAL RESULTS - PRIMARY GRID SURFACE SOIL SAMPLES- 0 to 1 INCH
DALLAS HOUSING AUTHORITY

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
PG-205	113	PG-222	94	PG-240	215	PG-272	617		
PG-206	241	PG-223	96	PG-248	88				
PG- 211	77	PG-230	86	PG-249	60				
PG-220	116	PG-231	65	PG-266	138				

460\DALLAS HOUSING\TABLES\4-1.tbl
6/10/92 mm

TABLE 4-2

ANALYTICAL RESULTS - PRIMARY GRID SURFACE SOIL SAMPLES - 0 to 1 INCH
DALLAS HOUSING AUTHORITY - AREA 2

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
AREA 2									
PG-207	88	PG-242	233	PG-265	196	PG-295	124		
PG-208	84	PG-243	45	PG-277	189	PG-297	408		
PG-209	112	PG-244	48	PG-278	169	PG-303	198		
PG-210	626	PG-245	135	PG-279	164	PG-304	248		
PG-224	176	PG-246	122	PG-280	67	PG-305	224		
PG-225	124	PG-247	272	PG-281	66	PG-313	289		
PG-226	105	PG-260	181	PG-282	294				
PG-227	222	PG-261	28	PG-291	301				
PG-228	86	PG-262	300	PG-292	116				
PG-229	113	PG-263	98	PG-293	198				
PG-241	198	PG-264	76	PG-294	268				

TABLE 4-3

ANALYTICAL RESULTS - PRIMARY GRID SURFACE SOIL SAMPLES - 0 to 1 INCH
DALLAS HOUSING AUTHORITY - AREA 3

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
AREA 3A									
PG-257	247	PG-290	161	PG-307	300	PG-316	241	PG-322	168
PG-259	176	PG-297	408	PG-308	63	PG-317	83	PG-323	134
PG-276	344	PG-299	20	PG-309	64	PG-318	18		
PG-288	82	PG-301	457	PG-310	63	PG-319	290		
PG-289	238	PG-302	397	PG-315	49	PG-321	83		
AREA 3B									
PG-258	535	PG-275	1408	PG-287	836	PG-311	610		
PG-273	763	PG-285	568	PG-298	569	PG-312	735		
PG-274	579	PG-286	1481	PG-300	602	PG-325	1107		

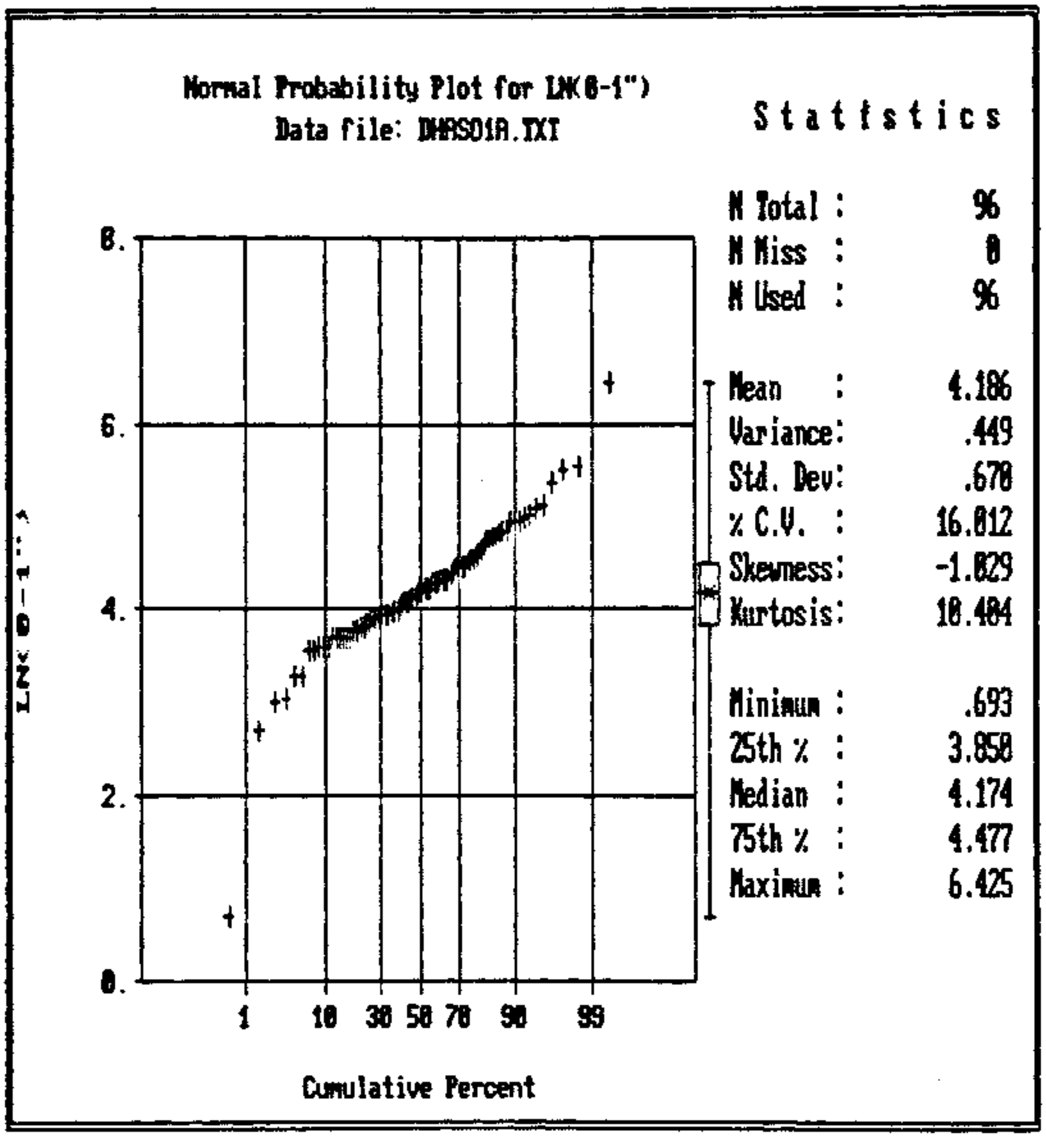
460\DALLAS HOS\USING\TABLES\4-3.tbl
6/10/92 mm

TABLE 4-4

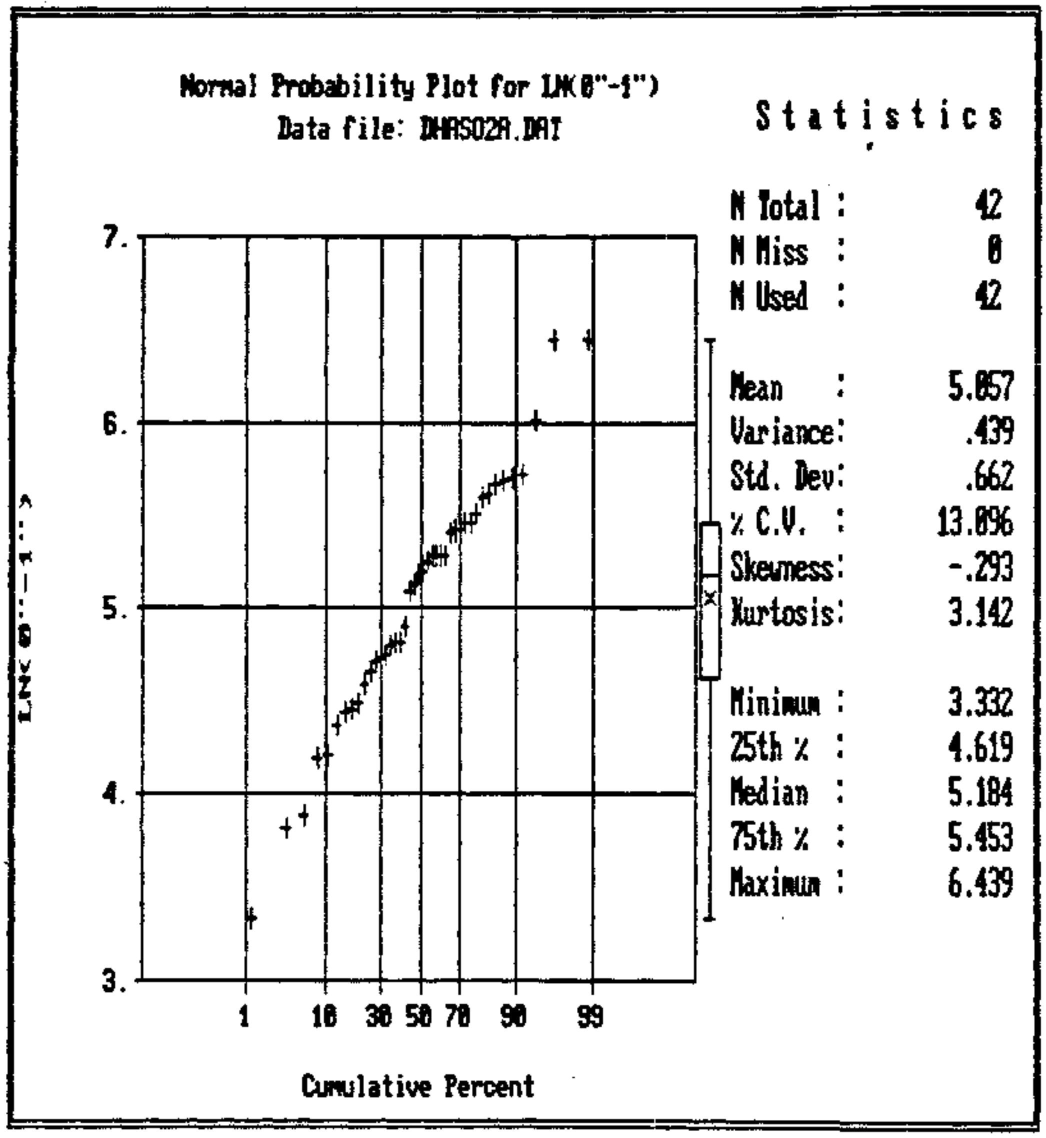
ANALYTICAL RESULTS - SECONDARY GRID SURFACE SOIL SAMPLES - 0 to 1 INCH
DALLAS HOUSING AUTHORITY

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
AREA 1		**AREA 2**	
SG-001	118	SG-002	234
SG-004	126	SG-003	224
SG-005	85	SG-011	625
SG-006	76		
SG-007	51		
SG-008	69		
SG-009	54		
SG-010	75		

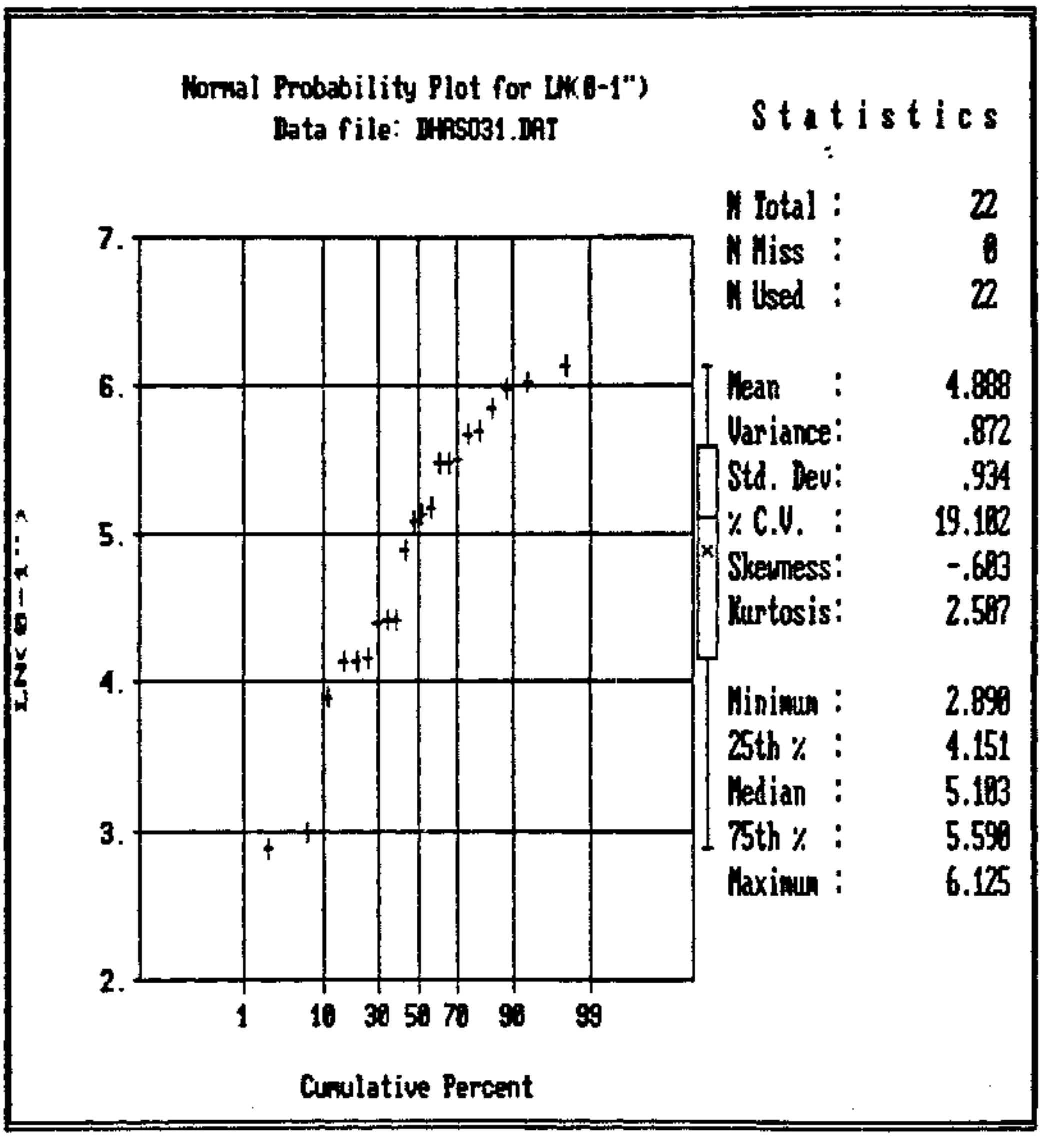
460\DALLAS HOUSING\TABLES\4-4.tbl
6/10/92 mm



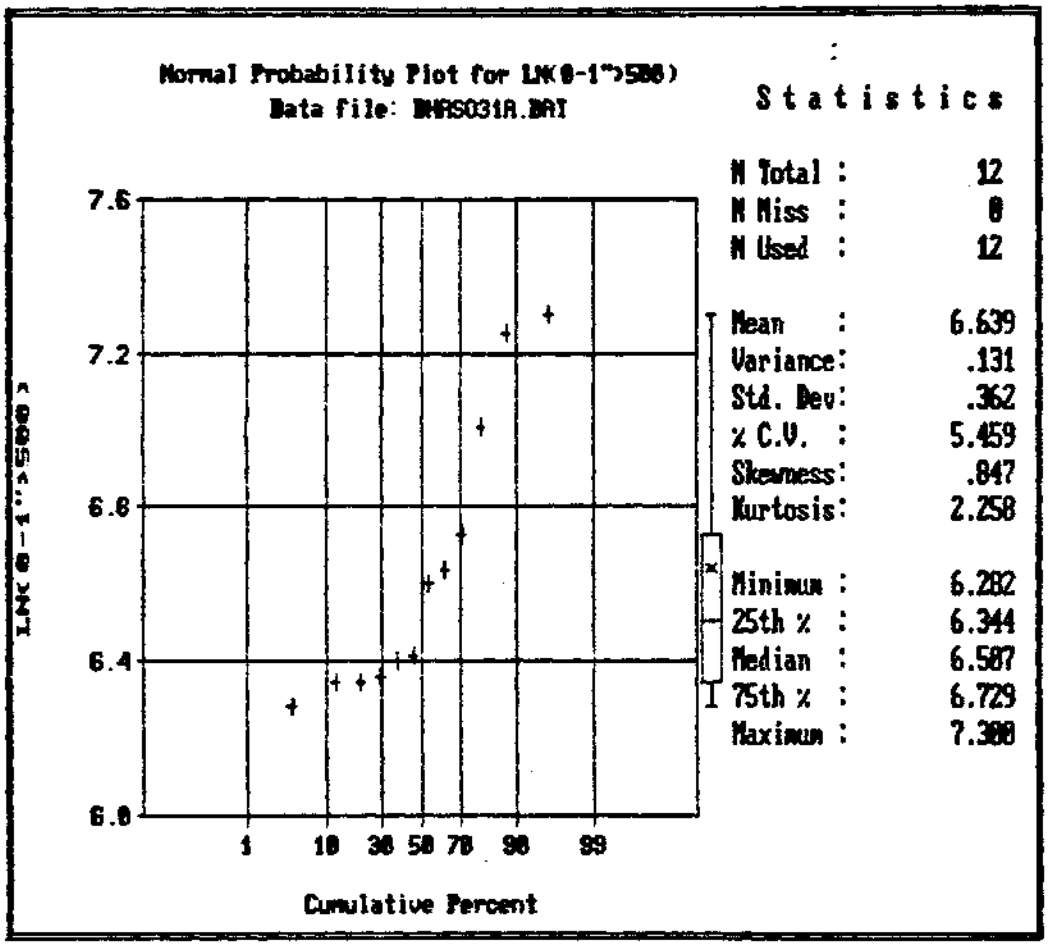
CDM *Dallas, Texas*	Dallas Housing Authority Site	Soil Probability Plot for Area 1	Figure No. 4-4



CDM *Dallas, Texas*	Dallas Housing Authority Site	Soil Probability Plot for Area 2	Figure No. 4-5



CDM *Dallas, Texas*	Dallas Housing Authority Site	Soil Probability Plot for Area 3A	Figure No. 4-6



CDM *Dallas, Texas*	Dallas Housing Authority Site	Soil Probability Plot for Area 3B	Figure No. 4-7

TABLE 4-5

EXPOSURE POINT CONCENTRATIONS USED IN MODELS				
	AREA 1	AREA 2	AREA 3A	AREA 3B
SOIL (μg Pb/g)	93	240	336	1007
DUST (μg Pb/g)	141	141	141	141
DRINKING WATER CONC. (μg Pb/L)	6	6	6	6

Dallas Housing/Tables/4-5.tbl
6/10/92 mm

has received little impact from the smelter and may serve, at least for lead in soil, as a reference area for lead exposures in the absence of smelter influences.

The exposure point concentration for Area 2 is 240 mg/kg with a range of 28 to 625 mg/kg. Only one value exceeds 408 mg/kg. The upper confidence limit on the geometric mean is significantly higher than that for Area 1 using the Student's t test ($p < 0.05$), suggesting that historical deposition from the RSR smelter was substantial in this area. The exposure point concentration and the range of individual values is, however, significantly below action levels for residential soils which have been used at Superfund sites where lead was a primary concern. Area 2 can be viewed, then, as an area where smelter impacts to soils are significant, but relatively minor.

Exposure point concentrations for Areas 3a and 3b are 336 and 1007 respectively. These concentrations appear to reflect differences in soil lead levels in areas of greatest impact from historical smelter emissions, where surface soil was removed and replaced (Area 3a), and where the only efforts were to encourage grass cover (Area 3b). The results suggest that the removal action did decrease lead concentrations in soil nearest the DHA property, but that, even so, the concentrations of lead which remain are well above background.

In unremediated portions of Area 3, soil concentrations remain high, and this subarea can serve to estimate lead exposures to soils in areas of maximum smelter impact. This subarea, along with subarea 3a are no longer inhabited, and the housing units are currently in a state of considerable disrepair. Thus, any exposures suggested by this risk assessment would only apply to future residents who might live in housing units after rehabilitation.

It should be noted that the small number of data points within Area 3b make it difficult to determine if soil concentrations are actually log-normally distributed in this area. It is possible that using the upper 95 percent confidence limit on the geometric mean underestimates actual exposures that might occur in this area. However, where more data points are available, concentrations are log-normally distributed (e.g., Areas 1, 2, and 3a). It is likely that a larger sample size for Area 3b would reveal a log-normal distribution. Moreover, exposures for Area 3b are predicted to exceed target criteria (Section 6.3). Uncertainty in the exposure point concentration, due to the small sample size, emphasizes the need for remediation in this area.

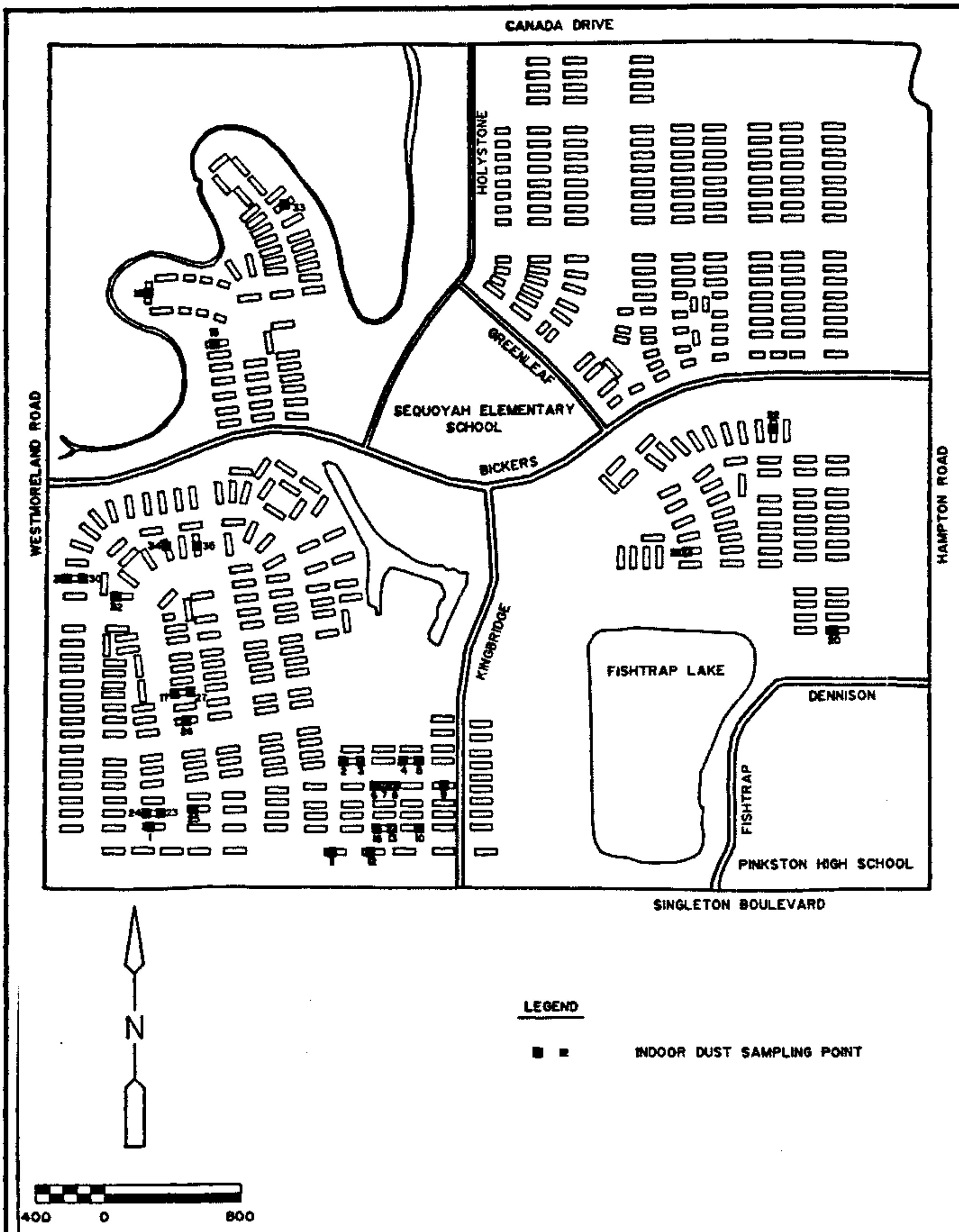
Dust

Thirty-one indoor dust samples at separate rental units were taken at the DHA site by CDM. These measurements varied considerably, ranging from < 1.0 to 101 μg lead/filter in occupied units and from 96.3 to 6600 μg/filter in unoccupied units. Measurements in units of μg/filter are not directly useable in risk assessment. Therefore, in 11 of the units, additional measurements, in units of mg lead/kg dust, were taken. Using the 11 locations for which concentrations of lead in dust were expressed in both units (μg/filter and mg/kg), regression analysis was applied to the data. The results of the regression analysis allowed conversion of the remaining measurements, in units of μg/filter, to units of mg/kg.

Of the 31 samples, 19 were from occupied units. Locations of all sampled units are shown on Figure 4-8; sampling results are provided in Table 4-6. The arithmetic mean of the 19 samples was derived and used as model input. Use of the arithmetic mean is appropriate when sample numbers are limited and variability is small, as in this case. Lead dust levels were directly related to housing conditions. Mean lead dust levels in occupied dwellings was 141 mg/kg, while that in unoccupied dwellings was 1748 mg/kg. Dust lead measurements and the results of the regression analysis are provided in Appendix C.

The high concentrations of lead in dust in unoccupied units suggests that workers entering old units frequently could be at risk for excessive lead exposure. Since these older units are mostly scheduled for demolition (Henderson 1992), it was not thought appropriate to include an analysis of risk for workers involved in renovating currently abandoned units. If, however, attempts are made to reclaim these units in the future, the issue of lead exposure to workers should be revisited.

The model allows input of age-specific estimates of lead intake from paint chips and incorporates these values in the calculation of total lead uptake. For soil and dust, inhalation rates and incidental ingestion rates by age may be included as default values in the model or they may be supplied by the user. For this analysis, default values are accepted as appropriate since no site-specific information for these parameters was available.



CDM *Dallas, Texas*	Dallas Housing Authority Site	Indoor Dust Sampling Locations	Figure No. 4-8

TABLE 4-6

LEAD CONCENTRATIONS OF INDOOR DUST SAMPLES

SAMPLE I.D.	RESIDENCE OCCUPIED	TOTAL LEAD (μg/filter)	LEAD (mg/kg)	SAMPLE I.D.	RESIDENCE OCCUPIED	TOTAL LEAD (μg/filter)	LEAD (mg/kg)
ID-01	No	1854.0	1351	ID-18	Yes	42.8	153
ID-02	Yes	19.8	138	ID-20	Yes	2.1	126
ID-03	Yes	15.9	135	ID-21	Yes	89.3	184
ID-04	Yes	10.2	131	ID-22	No	3.4	127
ID-05	Yes	< 1.0	125	ID-23	No	1545	1146
ID-06	Yes	5.2	128	ID-24	No	6600	4489
ID-07	Yes	24.6	141	ID-25	No	3675	2555
ID-08	Yes	45.2	155	ID-26	No	5952	4061
ID-09	Yes	5.3	128	ID-27	No	1440	1077
ID-10	Yes	21.9	139	ID-28	QA/QC blank	<0.1	<0.1
ID-11	Yes	34.3	147	ID-29	QA/QC blank	<0.1	<0.1
ID-12	Yes	10.0	131	ID-30	No	1342	<0.1
ID-13	Yes	17.9	136	ID-31	No	3539	2465
ID-14	Yes	Not Analyzed		ID-32	No	525	472
ID-15	Yes	21.2	139	ID-33	Yes	101	191
ID-16	Yes	6.4	129	ID-34	No	350	
ID-17	No	96.3	188	ID-35	No	442	417

460\DALLAS HOUSING\TABLES\4-6.tbl
6/10/92 mm

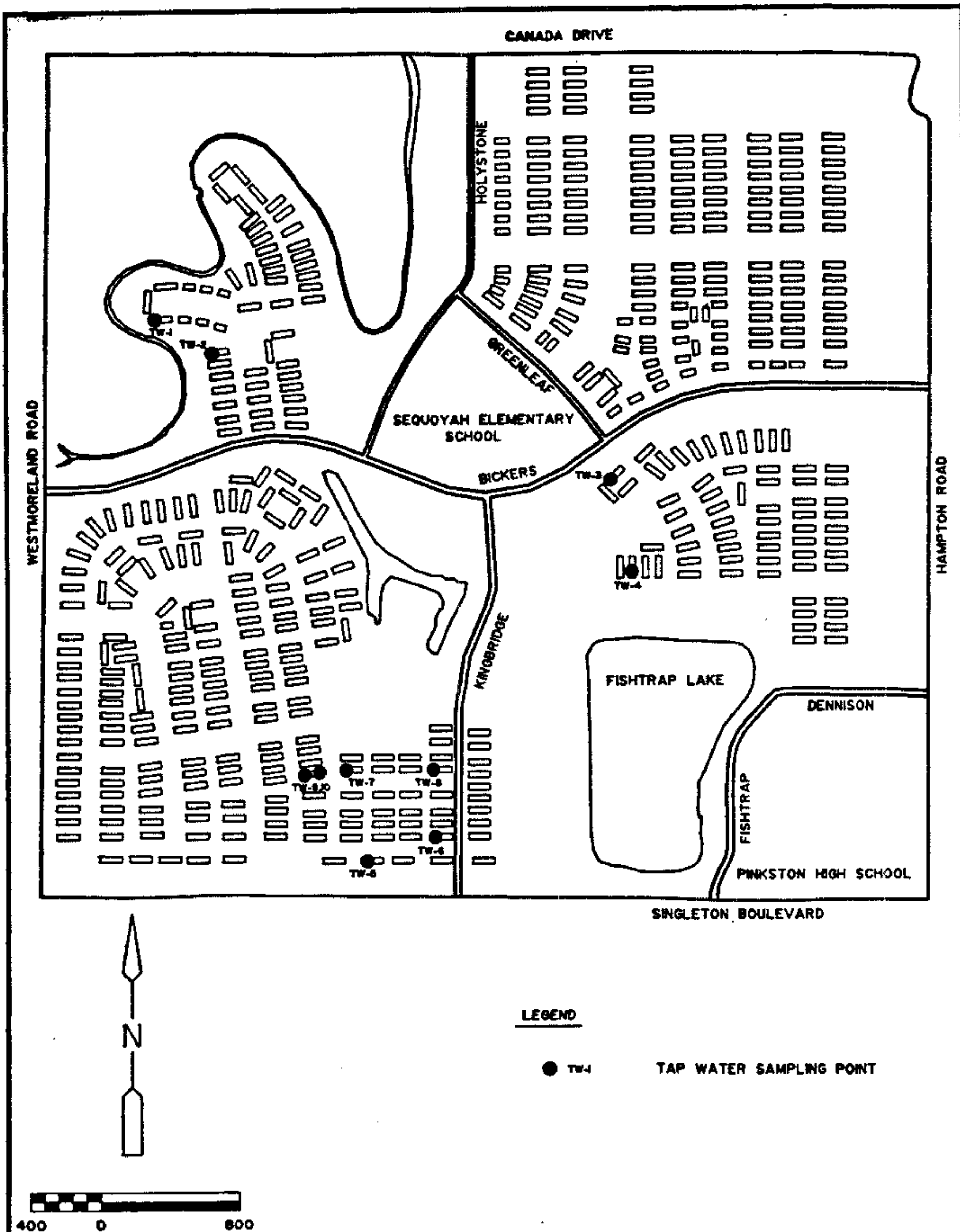
4.5.2.2 Lead Levels in Water

As previously stated, actual site monitoring data are preferable as input parameters. For drinking water, sampling of water at the tap is preferable. In the absence of acceptable monitoring data, the model uses a default value that assumes a mix of water sources including first draw, water flushed from household plumbing and water from drinking fountains. First draw water is water which has been in household pipes for several hours, while flushed water follows the removal of standing water. A default value for daily water intake is supplied by the model, or this may also be user supplied.

Limited sampling of tap water was performed at the DHA site in 10 apartments, chosen at random among uninhabited dwellings. These locations are shown on Figure 4-9. Dwellings representing a range of house conditions on site, including gut rehabilitated, partially rehabilitated, and no rehabilitation, were sampled. First draw water was collected and analyzed for lead and copper. In the 10 samples, the highest lead level reported was 16 μg/L in an unrehabilitated apartment. There did not appear to be a relationship between the condition of the house and the lead levels in tap water, but the number of samples was too small to statistically evaluate the relationship between these factors. Table 4-7 lists tap water concentrations and rehabilitation status of each sample location. When sample size is small, it is not possible to adequately characterize the distribution of lead concentrations. In this case, the arithmetic mean is to be used in exposure assessment (USEPA 1989a). The arithmetic mean of the 10 samples was derived (6.0 μg/L) and used as an input parameter to the model. A sensitivity analysis (Section 4.6.3) includes an analysis using the maximum detected value in water.

4.5.2.3 Lead Levels in the Diet

Lead is present in many commonly consumed food items. The IUBK model uses default parameters for lead in the diet derived from FDA Market Basket Surveys. For example, the model assumes dietary lead levels of 0.1 μg/gm food for a pregnant woman. These dietary values do not change with increasing air, soil, or water lead levels since most individuals derive little of their dietary intake from areas very near a lead source. This may vary on a site-specific basis, however, and alternate diet values may be input to the model. Actual site-specific dietary lead levels are seldom available.



CDM *Dallas, Texas*	Dallas Housing Authority Site	Tap Water Sampling Locations	Figure No. 4-9

TABLE 4-7

ANALYTICAL RESULTS

TAP WATER SAMPLES

SAMPLE I.D.	LEAD (ug/L)	REHABILITATION STATUS
TW-1	11.1	Gut Rehab
TW-2	1.6	Gut Rehab
TW-3	2.5	No Action
TW-4	1.7	Partial Rehab
TW-5	<2.0	Made Ready[1]
TW-6	16.3	No Action
TW-7	3.1	Made Ready
TW-8	6.7	No Action
TW-9	2.6	No Action
TW-10	12	No Action

[1] Cleaned and Painted Only.

In some instances these may be modeled for specific foods using atmospheric source/dispersion/uptake models.

Because actual dietary lead levels for residents of DHA housing are not available, default parameters for lead in the daily diet provided in the IUBK model are used. Use of these parameters should be adequate since the site is not conducive to produce gardening and DHA discourages this practice.

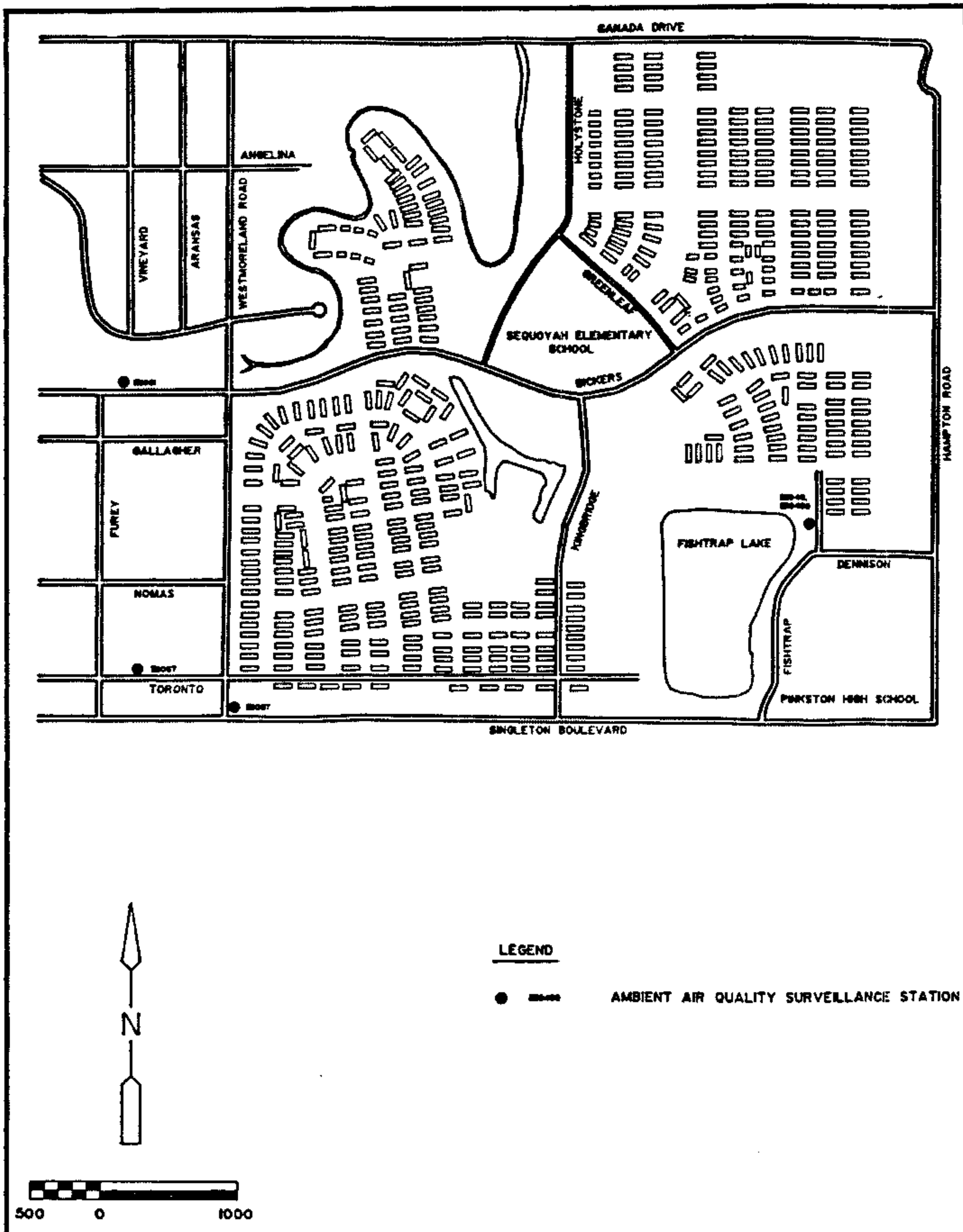
4.5.2.4 Lead Levels in Air

Five air monitoring stations, provided and monitored by the City of Dallas, have been in place within 2 miles of the RSR smelter. The oldest of these operated from 1979 through 1988, while the most current monitor operated from 1983 through 1991. The five stations, identified by station number and location, are shown on Figure 4-10.

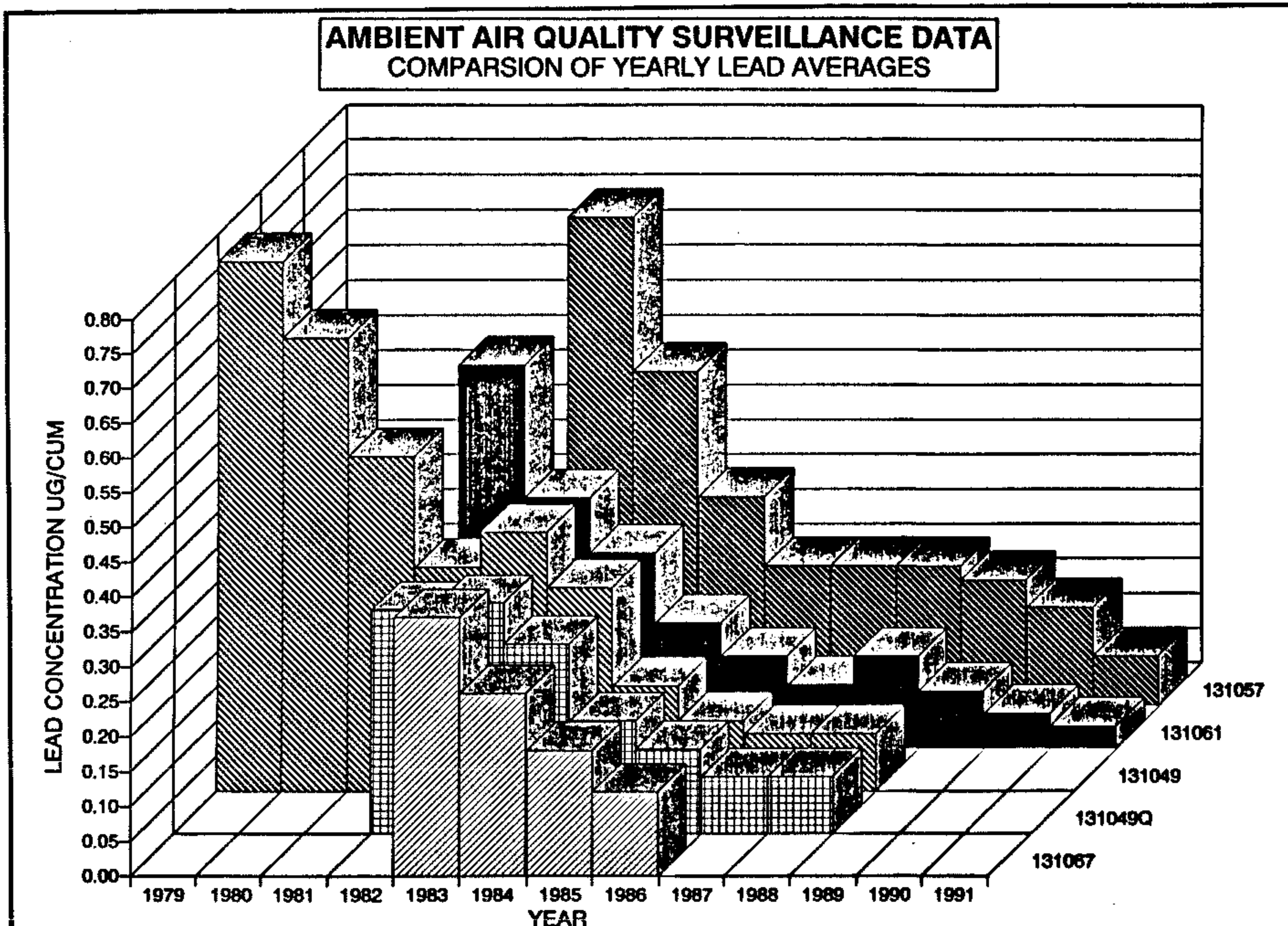
All five monitors, regardless of when put in place, show a similar trend in air lead levels, as shown in Figure 4-11 and Table 4-8. From 1979 to 1991 air lead levels steadily decreased from the highest yearly average of 0.76 μg lead/m^3 (Station 131049) to a low of 0.03 μg lead/m^3 (Station 131061). This trend likely reflects EPA-mandated controls on point source releases of air contaminants and the phasing out of lead-containing gasoline. Air monitoring data are provided in Appendix D.

The IUBK default value for lead in air (0.2 μg/m^3) is used in this analysis. This is a reasonable estimate since maximum air lead levels for the two monitors having the most current monitoring data (1991) for May to September were 0.1 and 0.2 μg/m^3 for monitors 131061 and 131057, respectively.

Lead exposures are expected to be highest in warm weather months when children play more outdoors, and hence ingest more play-area soils. During this time, high air Pb levels might have maximum impact, since any incremental exposure would increase blood lead levels above seasonal maximums based on soil contact. No air data collected during warm weather months exceeded the default value of 0.2 μg/m^3. Using the default value, therefore, is unlikely to underestimate potential lead exposures.



CDM *Dallas, Texas*	Dallas Housing Authority Site	Ambient Air Quality Surveillance Locations	Figure No. 4-10



CDM *Dallas, Texas*	Dallas Housing Authority Site	Ambient Air Quality Surveillance Data - Comparison of Yearly Lead Averages	Figure No. 4-11

TABLE 4-8

AMBIENT AIR QUALITY SURVEILLANCE DATA

COMPARSION OF YEARLY AVERAGES

YEAR	STATION 131049	STATION 131049Q	STATION 131057	STATION 131061	STATION 131067
1979	0.76				
1980	0.65				
1981	0.48				
1982	0.32	0.32		0.55	
1983	0.37	0.33	0.7	0.36	0.37
1984	0.29	0.27	0.48	0.28	0.26
1985	0.15	0.16	0.3	0.18	0.18
1986	0.1	0.12	0.2	0.13	0.12
1987	0.08	0.08	0.2	0.09	
1988	0.08	0.08	0.2	0.13	
1989			0.18	0.08	
1990			0.14	0.05	
1991			0.07	0.03	

460/Dallas/Tables\4-8.tbl
6/10/92 mm

4.5.2.5 Maternal Contribution to Levels in Infants

Transplacental transfer of lead in humans has been demonstrated in a number of studies. There is no metabolic barrier to the uptake of lead by the fetus; therefore, exposure of the pregnant woman to lead results in uptake by the fetus (ATSDR 1990). Lead levels in a neonate contribute to lead levels in the child for several years after birth, although the impact is by far greatest during the first year. The IUBK model allows estimation of the mother's contribution to the neonate's lead levels by two different methods:

- The Infant Method, which requires as input the mother's blood lead level at the time of birth and estimates tissue and blood levels for the neonate; and
- The Fetal Method, which is a separate uptake/biokinetic model within the IUBK model. The user provides lead exposure values for the mother (e.g., inhalation, ingestion rates of lead) from which levels in the fetus are estimated throughout pregnancy (USEPA 1990a).

Blood lead which may be transferred from a mother to a newborn via placental transfer is estimated using the default parameter for maternal blood lead at the time of birth (7.5 μg lead/dL) in the infant method. No blood lead data for pregnant women living on DHA property was available. However, of 110 women aged 18 to 45 and living in DHA housing and screened for blood lead concentrations (City of Dallas 1992), only one had a blood lead concentration above 10 μg/dL, and the geometric mean blood lead level was 2.9 μg/L (See Table 4-9 for a listing of women screened for blood lead). Using 7.5 μg/dL as an average would seem conservative for women living in the area. Use of the 2.9 value was deemed inappropriate since blood lead levels may change significantly during pregnancy and could increase in women with a substantial burden of lead in bone.

4.5.2.6 Geometric Standard Deviation

The IUBK model predicts mean blood lead levels associated with exposure levels in various media. However, to assess the risks associated with such exposures, use of some upper bound on blood lead levels in some fraction of the population will result in a more conservative regulatory or abatement decision (USEPA 1990a). In order to identify or predict a reasonable upper bound, a frequency distribution of blood lead levels must be estimated. The distribution of blood lead levels is log normal (i.e., when the natural log of blood lead levels in a population is plotted by frequency, the

TABLE 4-9

BLOOD LEAD CONCENTRATIONS FOR WOMEN (AGES 18 TO 45)

CENSUS TRACK 102		CENSUS TRACK 103		CENSUS TRACK 104	
Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (Years)
0.5	34.3	0.5	19.3	0.5	19.6
1	31.1	1	23.1	1	18.5
1	35.2	1	29.2	1	41.2
1	27.1	1	39.5	1	17.7
1	18	2	40.9	1	30.8
1	25.5	2	19.1	1	20.2
1	40.2	2	25.5	1	23.6
2	22.1	2	31.1	2	25.5
2	27.5	3	25	2	23.5
2	28.7	3	20.1	2	19.8
2	30.7	3	30.4	2	37.6
2	27.5	4	25.3	2	33.4
3	28.7	4	29.2	2	35.4
3	31.3	4	34	2	35
3	18.2	5	31.7	2	37.2
3	19.3	5	25	2	29.1
3	36.5	5	27.7	2	26.3
4	34.3	15	18.2	2	42
4	40.1			2	18.5
4	32.1			2	23.9
4	44.8			2	35.8

481\DALLAS\TABLES\4-9.TBL
6/10/92 sd

TABLE 4-9 (Cont.)

BLOOD LEAD CONCENTRATIONS FOR WOMEN (AGES 18 TO 45)

CENSUS TRACK 102		CENSUS TRACK 103		CENSUS TRACK 104	
Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (Years)
5	40			2	18.7
5	37			2	18.1
5	32			3	32.4
5	27.4			3	31.2
5	27			3	31.6
5	40.6			3	33.7
5	31.3			3	40.7
5	32.8			3	26.2
5	25.5			3	30.7
9	31.6			3	21.5
				3	23.1
				3	37.4
				3	38.3
				4	25.3
				4	38.7
				4	32.1
				4	42.3
				4	18.1
				4	45
				4	34.1

481\DALLAS\TABLES\4-9.TBL
6/10/92 ed

TABLE 4-9 (Cont.)

BLOOD LEAD CONCENTRATIONS FOR WOMEN (AGES 18 TO 45)

CENSUS TRACK 102		CENSUS TRACK 103		CENSUS TRACK 104	
Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (years)	Blood Level (μg/L)	Age (Years)
				4	39
				4	25.8
				4	24.6
				4	28.7
				5	19.5
				5	34.3
				5	21.5
				5	43.3
				5	31.6
				5	27
				5	24.3
				6	26.5
				7	23.2
				7	40.7
				8	26.3
				9	66
				9	29

481\DALLAS\TABLES\4-9.TBL
6/10/92 ed

resulting curve is normally distributed). Log normal distributions are defined by their geometric means (measurements of central tendency) and geometric standard deviations (indicators of variance about the geometric mean). A geometric mean blood lead is predicted by the model, while the geometric standard deviation (GSD) is an input parameter into the model. The OAQPS and others have studied empirical data on GSDs of blood lead from lead exposed populations including children living near lead point sources (USEPA 1990b). They concluded that a GSD in the range of 1.30 to 1.53 is reasonable for these children. The midpoint of this range, 1.42, is used as the default value for GSD in the IUBK model.

Additional information on GSDs has recently become available. Bornshein (1990) studied the population of Midvale, Utah, where a tailings site has contaminated some areas with lead. Bornshein reported that some subpopulations of children in the Midvale population had a larger GSD than predicted by the OAQPS and reported a community GSD of 1.64. Since a higher GSD would seem more protective, a value of 1.7 is chosen for this site. The GSD of 1.64 has been rounded up in this case to account for population subgroups with more variable exposures.

The larger GSDs found in recent studies probably reflect, at least in part, analytical difficulties in measuring blood levels below 10 μg/dL. Probably, children with unusual lead exposures, such as those whose parents work in the lead industry or have hobbies that require use of lead, also contribute. The latter children are often more prominent now that average lead exposures have dropped due to the reduction of lead in gasoline and diet. Neither of these sources of variability is likely to be significantly influenced by the nature of environmental lead sources. Thus, one expects that GSDs will be higher in future studies of lead exposure, regardless of the source of the lead. This supports the choice of a higher GSD for predictions of current lead exposure in the DHA areas.

4.6 RESULTS OF THE MODEL

4.6.1 USE OF THE MODEL

Version 0.6 of the IUBK model was used to estimate blood lead levels in children 0 to 6 years of age and to determine the probability of children's blood lead exceeding 10 μg/dL. For each of the three areas previously identified, the 95 percent upper confidence level for soil lead levels was input, as parameters used were model defaults. The default parameter for lead absorption was non-linear and assumed to be equally divided between passive and active uptake. After the model was run, probability density function graphs of blood lead were generated. From these, the percent of children whose blood lead level might be expected to exceed 10 μg/dL was determined. (See Section 6.1 for a discussion of 10 μg/dL as an acceptable blood lead level.)

4.6.2 MODEL OUTPUT

Table 4-10 lists input parameters used and Tables 4-11 to 4-14 present results of model runs for areas 1, 2, 3a and 3b, respectively. Predicted distributions of blood lead concentrations in young children indicate that the percentage of children expected to have blood lead in excess of 10 μg/dL is 0.61, 1.61, 2.53 and 16.50 for areas 1, 2, 3a and 3b, respectively. Figures 4-12 to 4-15 show the corresponding probability density functions for each model output.

Soil and dust uptake is predicted to be the largest contributor to lead exposure from all routes. In area 1, for example, total lead uptake for 6 to 12 month old children is estimated to be 7.16 μg/day. Approximately 50 percent of this total is from soils and dust uptake (Table 4-11). These results may be compared with an analysis using the IUBK default value for lead in soil (200 μg/g) which indicates that approximately 60 percent (6 μg/d) of total intake (10 to 11 μg/day) is from soils and dust uptake. It should be noted that uptake via the diet increases with age as the ingestion rate increases.

Estimated uptake via soil or dust for a particular soil lead level remains constant, however, since estimated soil/dust ingestion rates are constant (approximately 0.1 g/day) over ages 1 to 6.

4.6.3 SENSITIVITY ANALYSIS

<u>Water</u>

In order to quantify the sensitivity of the model to input values for tap water, the model was run again using an alternate value for this parameter. The maximum detected value of tap water (16 μg/L) was input to the model for each of the four areas identified (Section 4.5.2.1). Tables 4-15 to 4-18 and Figures 4-16 to 4-19 present the output of these model runs. Results of the sensitivity

TABLE 4-10

MODEL PARAMETERS

AIR CONCENTRATION: 0.200 μg Pb/m3

Indoor Air Pb Concentration: 30.0 percent of outdoor

Other Air Parameters:

Age (Years)	Time Outdoors (Hours)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	3.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

SOIL AND DUST

SOIL: Constant Concentration

DUST: Constant Concentration

Age (Years)	Soil (μg Pb/g)	House Dust (μg Pb/g)
0-1	varies by area[1]	141.0
1-2		141.0
2-3		141.0
3-4		141.0
4-5		141.0
5-6		141.0
6-7		141.0

DIET: Age (Years)	0-1	1-2	2-3	3-4	4-5	5-6	6-7
(μg/day)	5.88	5.92	6.79	6.57	6.36	6.75	7.48

DRINKING WATER CONCENTRATION: [2]

WATER Consumption:

Age (Years)	0-1	1-2	2-3	3-4	4-5	5-6	6-7
(L/d)	0.20	0.50	0.52	0.53	0.55	0.58	0.59

ABSORPTION METHODOLOGY: Non-linear Active-Passive

PAINT INTAKE: 0.00 μg Pb/day

MATERNAL CONTRIBUTION: Infant Model

Maternal Blood Concentration: 7.50 μg Pb/dL

[1] Refer to Model Results

[2] Refer to Model Results

460\Dallas\Tables\4-10.tbl
6/10/92 mm

TABLE 4-11

MODEL RESULTS AREA 1							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/dL)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	2.66	7.16	3.58	2.94	0.60	0.00	0.04
1-2	2.41	8.11	3.58	2.96	1.50	0.00	0.07
2-3	2.43	8.66	3.58	3.40	1.56	0.00	0.12
3-4	2.49	8.59	3.58	3.29	1.59	0.00	0.13
4-5	2.56	8.55	3.58	3.18	1.65	0.00	0.13
5-6	2.59	8.88	3.58	3.38	1.74	0.00	0.19
6-7	2.64	9.28	3.58	3.74	1.77	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 93.0 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 6.00 (μg Pb/L)

460\Dallas Housing\Tables\4-11.tbl
6/10/92 mm

TABLE 4-12

MODEL RESULTS AREA 2							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/L)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	3.23	9.15	5.57	2.94	0.60	0.00	0.04
1-2	3.00	10.10	5.57	2.96	1.50	0.00	0.07
2-3	3.00	10.65	5.57	3.40	1.56	0.00	0.12
3-4	3.06	10.57	5.57	3.29	1.59	0.00	0.13
4-5	3.16	10.53	5.57	3.18	1.65	0.00	0.13
5-6	3.19	10.87	5.57	3.38	1.74	0.00	0.19
6-7	3.23	11.26	5.57	3.74	1.77	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 240 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 6.00 (μg Pb/L)

460\Dallas Housing\4-12.tbl
6/10/92 mm

TABLE 4-13

MODEL RESULTS AREA 3A							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/L)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	3.61	10.44	6.86	2.94	0.60	0.00	0.04
1-2	3.38	11.39	6.86	2.96	1.50	0.00	0.07
2-3	3.37	11.94	6.86	3.40	1.56	0.00	0.12
3-4	3.44	11.87	6.86	3.29	1.59	0.00	0.13
4-5	3.54	11.83	6.86	3.18	1.65	0.00	0.13
5-6	3.57	12.16	6.86	3.38	1.74	0.00	0.19
6-7	3.61	12.56	6.86	3.74	1.77	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 336 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 6.00 (μg Pb/L)

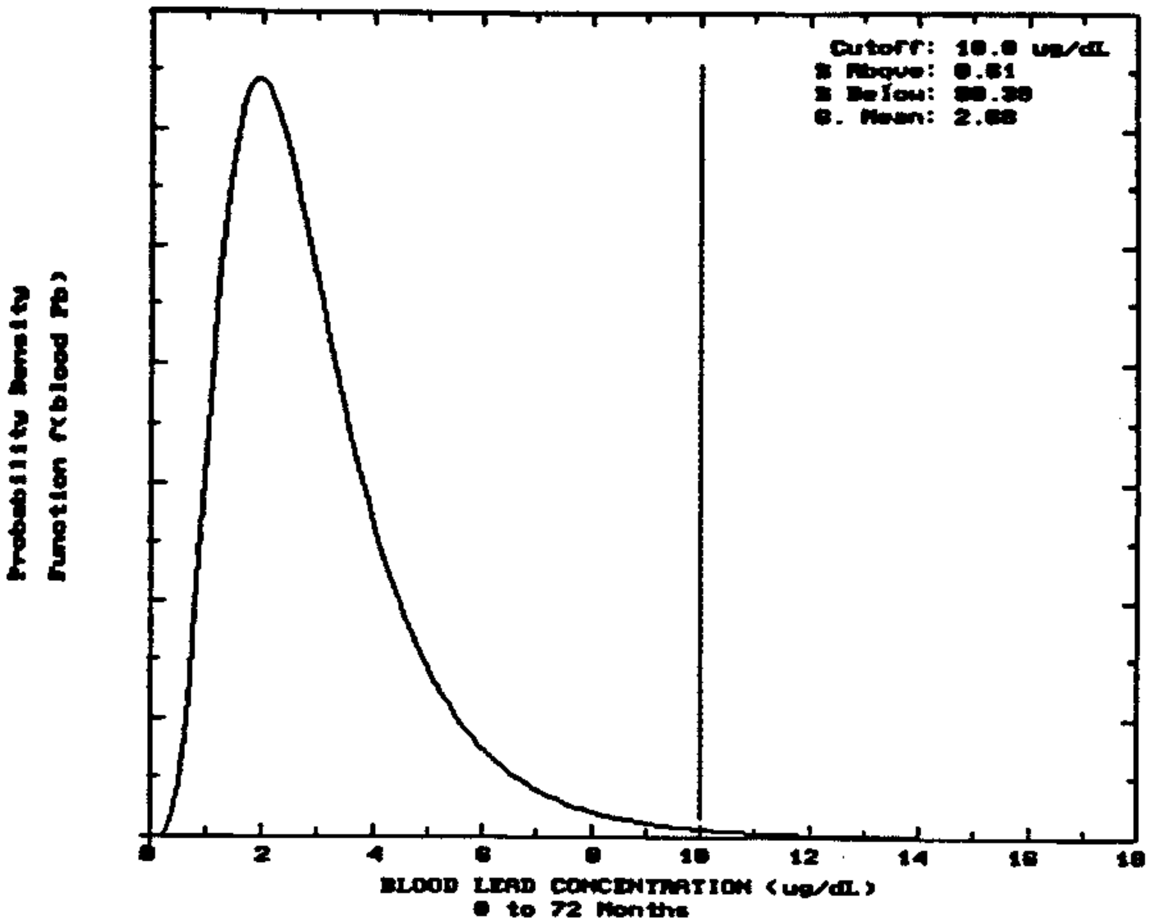
460\Dallas Housing\Tables\4-13.tbl
6/10/92 mm

TABLE 4-14

MODEL RESULTS AREA 3B							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/L)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	6.22	19.50	15.92	2.94	0.60	0.00	0.04
1-2	6.05	20.45	15.92	2.96	1.50	0.00	0.07
2-3	5.98	21.00	15.92	3.40	1.56	0.00	0.12
3-4	6.06	20.93	15.92	3.29	1.59	0.00	0.13
4-5	6.26	20.88	15.92	3.18	1.65	0.00	0.13
5-6	6.28	21.22	15.92	3.38	1.74	0.00	0.19
6-7	6.27	21.62	15.92	3.74	1.77	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 1007 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 6.00 (μg Pb/L)

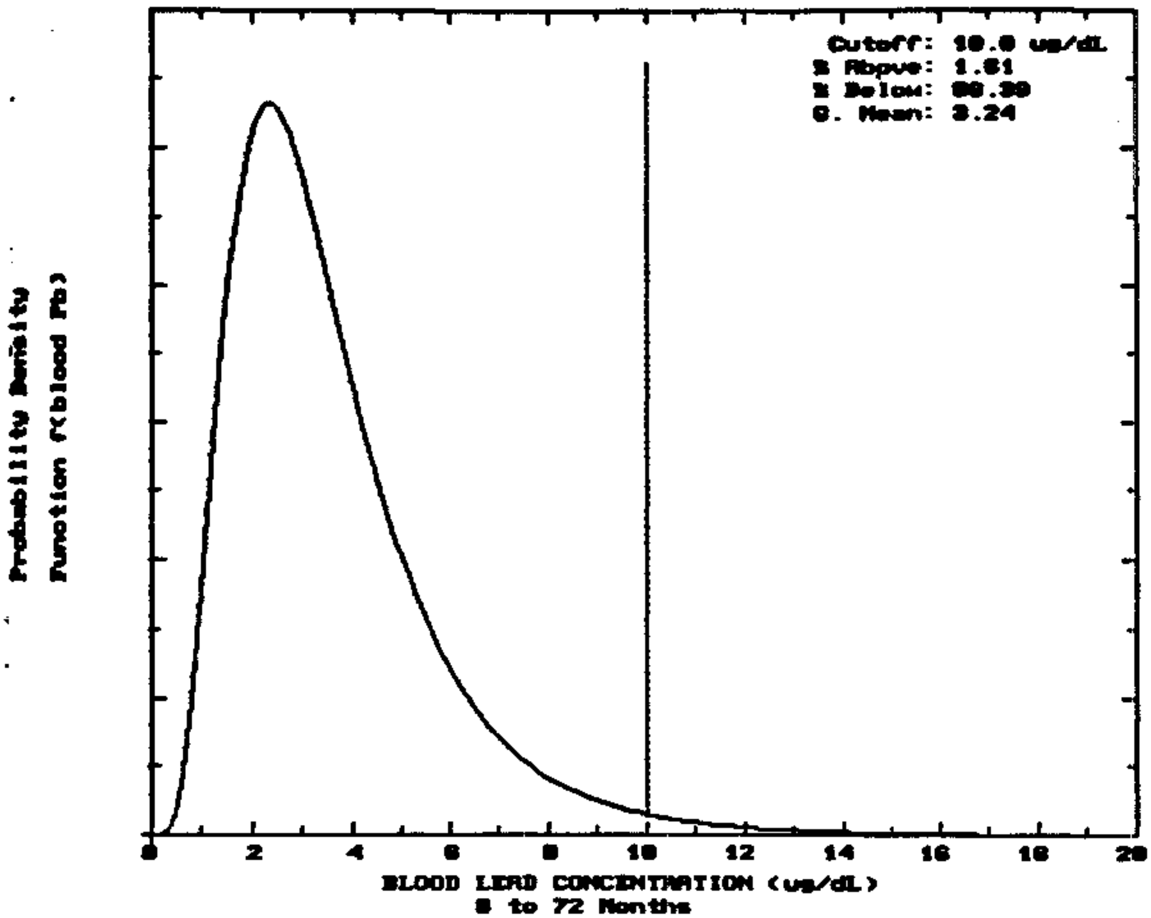
460\Dallas Housing\Tables\4-14.tbl
6/10/92 mm



Model Parameters

Soil = 93 mg/kg
Dust = 141 mg/kg
Water = 6 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

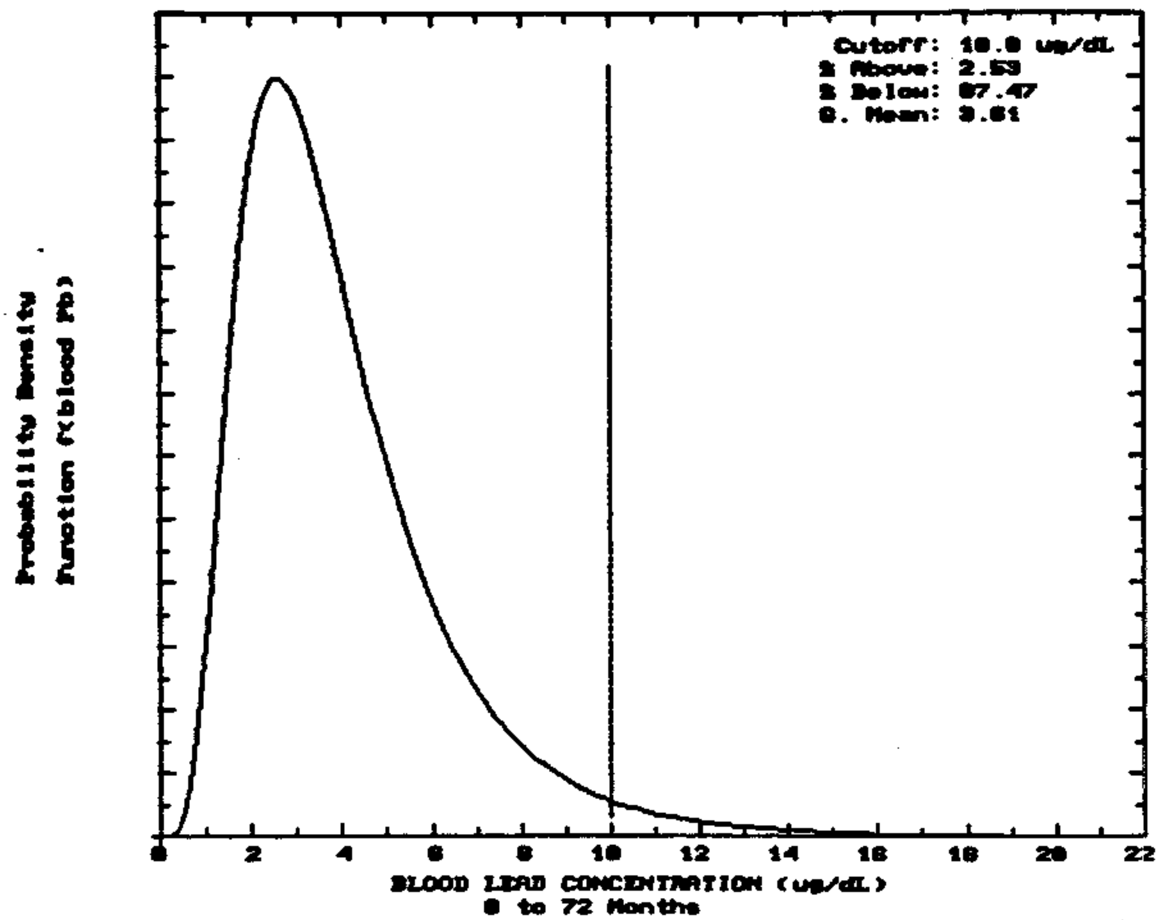
CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 1	Figure No. 4-12



Model Parameters

Soil = 240 mg/kg
Dust = 141 mg/kg
Water = 6 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

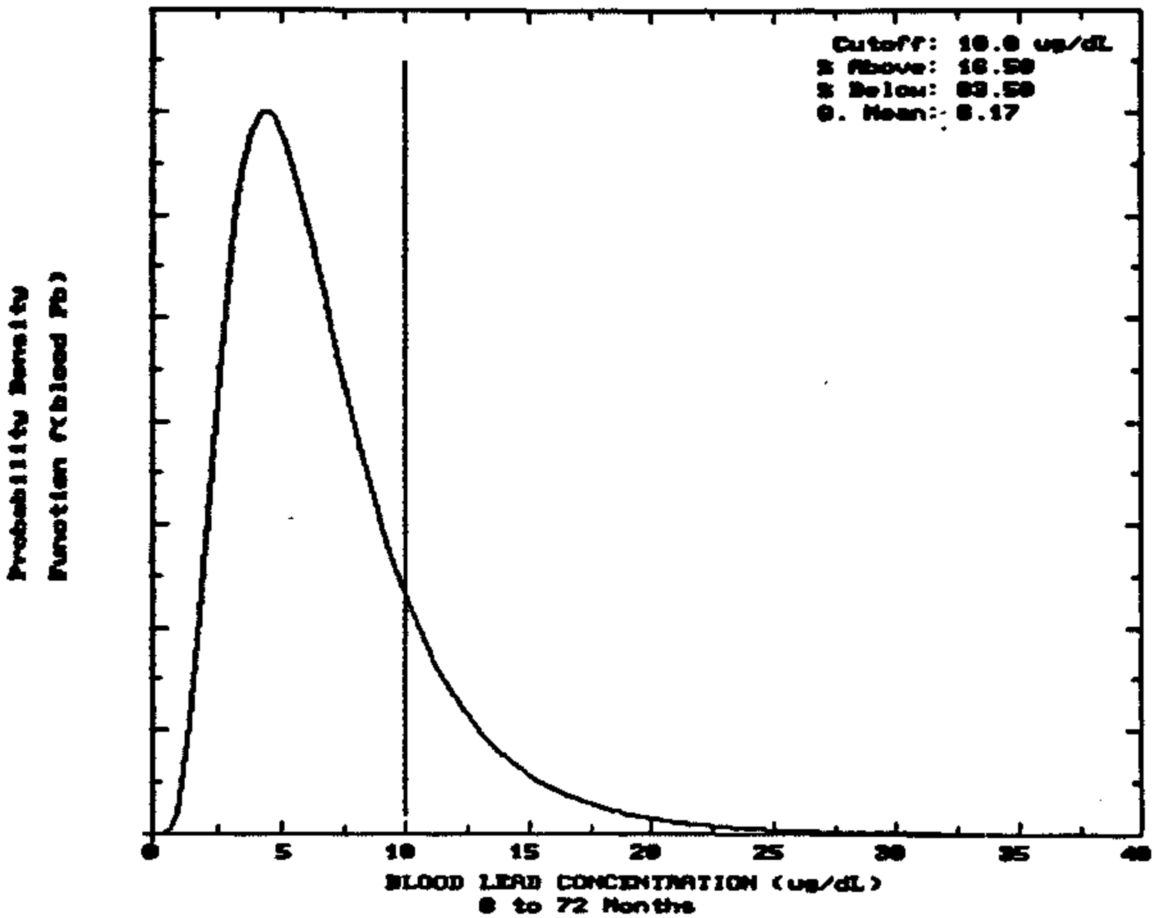
CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 2	Figure No. 4-13



Model Parameters

Soil = 336 mg/kg
Dust = 141 mg/kg
Water = 6 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 3A	Figure No. 4-14



<u>**Model Parameters**</u>

Soil = 1007 mg/kg
Dust = 141 mg/kg
Water = 6.0 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Distribution of Blood Lead Concentrations in Area 3B**	Figure No. 4-15

4-18 and Figures 4-16 to 4-19 present the output of these model runs. Results of the sensitivity analysis indicate that changing the input of tap water to the maximum detected value had measurable effect on the output of the model. For this analysis, the percent of children whose blood lead was expected to exceed 10 μg/dL increased from < 1 percent to 1.8 percent in area 1, from 1.6 to 3.6 percent in area 2, from 2.5 to 5.1 percent in area 3a, and from 16.5 to 22.5 percent in area 3b.

Dust

A similar analysis was performed using dust lead measurements from uninhabited units. The model was run with the arithmetic mean value of dust lead from these units (1748 mg/kg) in combination with soil lead values from areas 2, 3a and 3b, in which these units are located. The results illustrate the sensitivity of the model to changes in indoor dust lead levels. In this case, a change in dust levels of approximately one order of magnitude resulted in model predictions that 52, 49, and 70 percent of children could have blood lead levels in excess of 10 μg/dL for areas 2, 3a, and 3b, respectively. Figure 4-20 presents model results for this analysis.

Fish

Fishtrap Lake contains sediments with elevated levels of lead. It is possible that fish living in the lake may accumulate this lead in edible tissues. Persons eating fish caught in the lake could, then, be exposed to lead from this source. However, lead is not efficiently bioaccumulated in aquatic food webs (USEPA 1980), and significant accumulation in edible fish tissues is not expected. In confirmation, tissue samples from fish caught in Fishtrap Lake contained no lead concentrations above detection limits of 0.1 μg/g. Children consuming 50 percent of their total dietary meat consumption as fish from Fishtrap Lake are not expected to receive significant additional lead exposure. Model output of this analysis is shown on Figure 4-21. Ingestion of locally caught fish does not appear to represent a significant potential exposure pathway.

TABLE 4-15

SENSITIVITY ANALYSIS MODEL RESULTS AREA 1							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/dL)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	2.96	8.19	3.58	2.94	1.63	0.00	0.04
1-2	3.00	10.69	3.58	2.96	4.08	0.00	0.07
2-3	3.16	11.34	3.58	3.40	4.24	0.00	0.12
3-4	3.26	11.32	3.58	3.29	4.32	0.00	0.13
4-5	3.39	11.38	3.58	3.18	4.48	0.00	0.13
5-6	3.45	11.87	3.58	3.38	4.73	0.00	0.19
6-7	3.52	12.32	3.58	3.74	4.81	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 93.0 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 16.30 (μg Pb/L)

460\Dallas Housing\tables\4-15.tbl
6/10/92 mm

TABLE 4-16

SENSITIVITY ANALYSIS MODEL RESULTS AREA 2							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/L)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	3.53	10.18	5.57	2.94	1.63	0.00	0.04
1-2	3.59	12.67	5.57	2.96	4.08	0.00	0.07
2-3	3.73	13.32	5.57	3.40	4.24	0.00	0.12
3-4	3.83	13.30	5.57	3.29	4.32	0.00	0.13
4-5	3.98	13.36	5.57	3.18	4.48	0.00	0.13
5-6	4.05	13.86	5.57	3.38	4.73	0.00	0.19
6-7	4.10	14.30	5.57	3.74	4.81	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 240 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 16.30 (μg Pb/L)

460\Dallas Housing\tables\4-16.tbl
6/10/92 mm

TABLE 4-17

SENSITIVITY ANALYSIS MODEL RESULTS AREA 3A							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (μg/dL)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	3.90	11.47	6.86	2.94	1.63	0.00	0.04
1-2	3.97	13.97	6.86	2.96	4.08	0.00	0.07
2-3	4.10	14.62	6.86	3.40	4.24	0.00	0.12
3-4	4.21	14.60	6.86	3.29	4.32	0.00	0.13
4-5	4.37	14.66	6.86	3.18	4.48	0.00	0.13
5-6	4.43	15.15	6.86	3.38	4.73	0.00	0.19
6-7	4.48	15.60	6.86	3.74	4.81	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 336 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 16.30 (μg Pb/L)

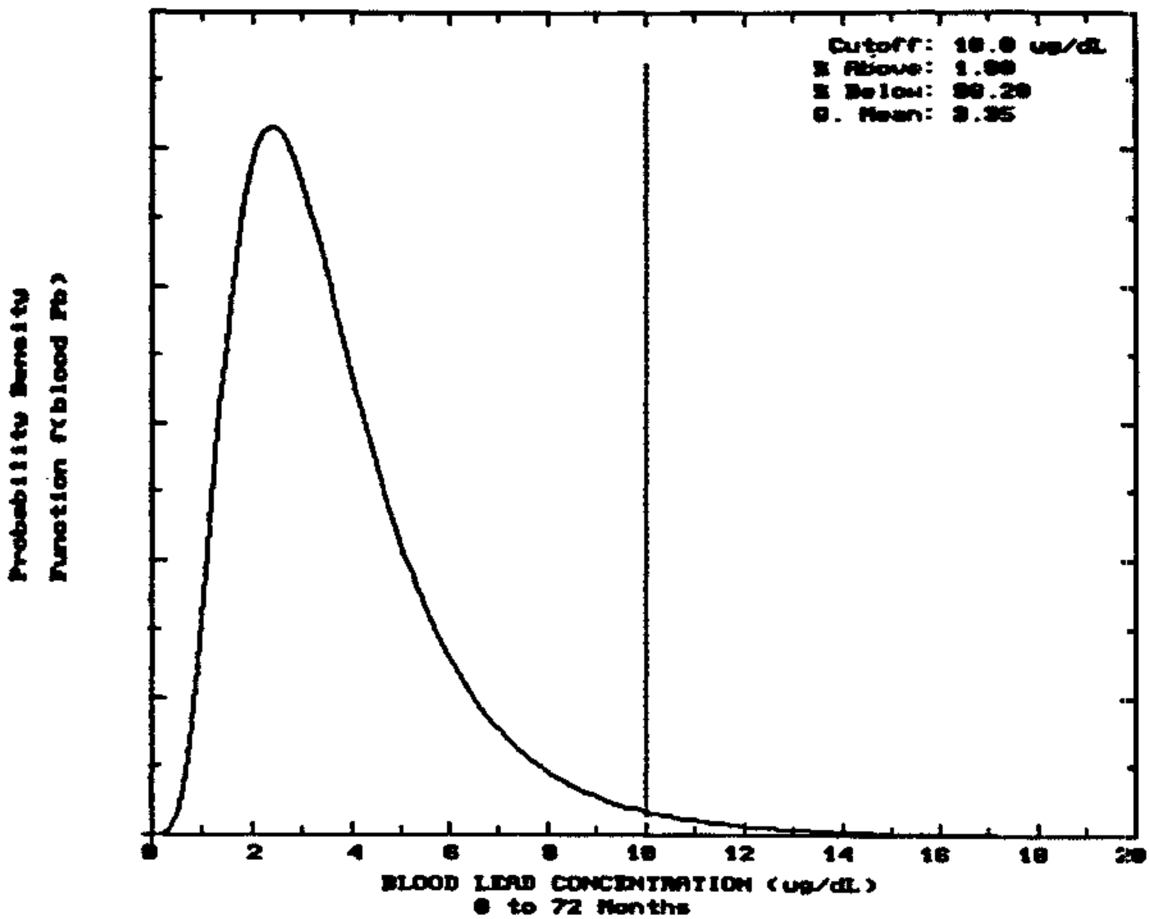
481\Dallas Housing\Tables\4-17.tbl
6/10/92 mm

TABLE 4-18

SENSITIVITY ANALYSIS MODEL RESULTS AREA 3B							
CALCULATED BLOOD Pb and Pb UPTAKES							
Age (Years)	Blood Level (µg/dL)	Total Uptake (µg/day)	Soil & Dust Uptake (µg/day)	Diet Uptake (µg/day)	Water Uptake (µg/day)	Paint Uptake (µg/day)	Air Uptake (µg/day)
0.5-1	6.52	20.53	15.92	2.94	1.63	0.00	0.04
1-2	6.64	23.02	15.92	2.96	4.08	0.00	0.07
2-3	6.71	23.68	15.92	3.40	4.24	0.00	0.12
3-4	6.84	23.66	15.92	3.29	4.32	0.00	0.13
4-5	7.09	23.72	15.92	3.18	4.48	0.00	0.13
5-6	7.14	24.12	15.92	3.38	4.73	0.00	0.19
6-7	7.15	24.66	15.92	3.74	4.81	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 1007 (µg Pb/g)
DRINKING WATER CONCENTRATION used in model: 16.30 (µg Pb/L)

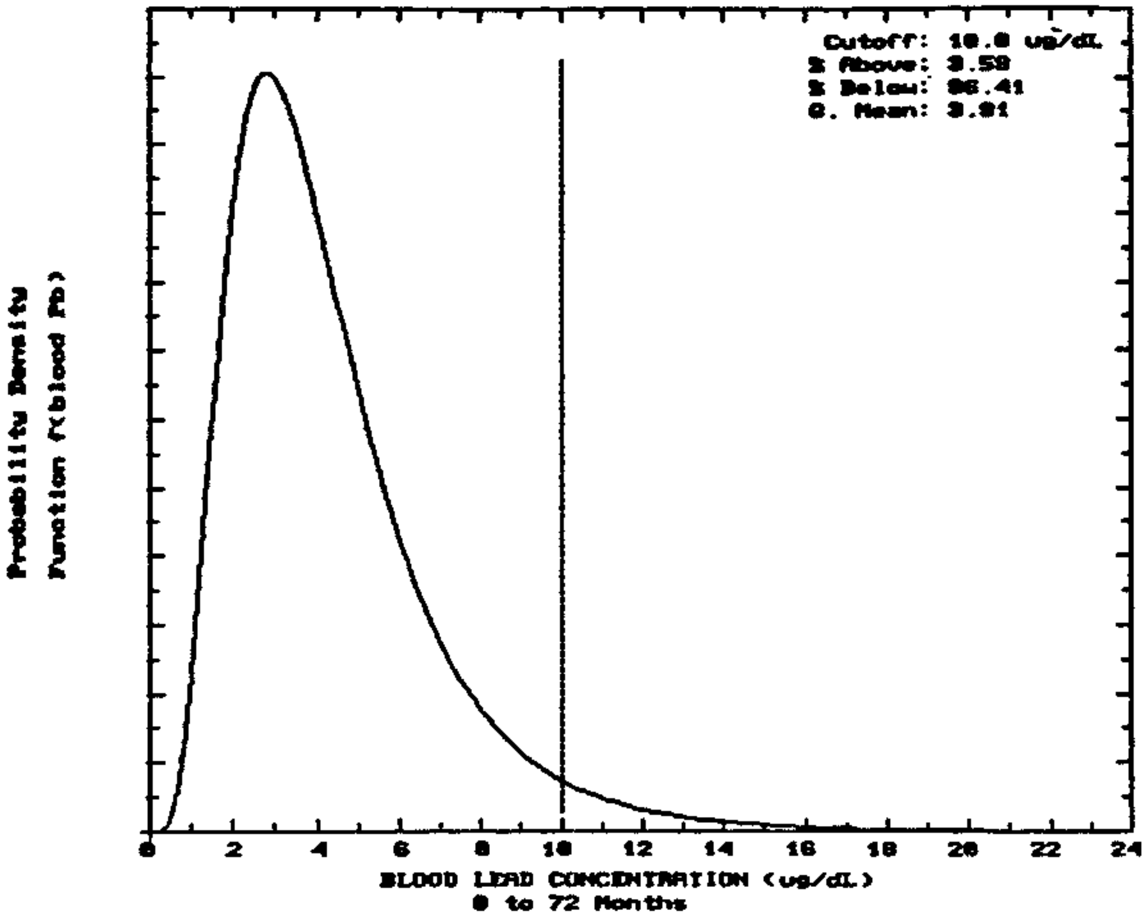
481/Dallas/Tables/4-18.tbl
6/10/92 mm



Model Parameters

Soil=93 mg/kg
Dust = 141 mg/kg
Water = 16.3 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

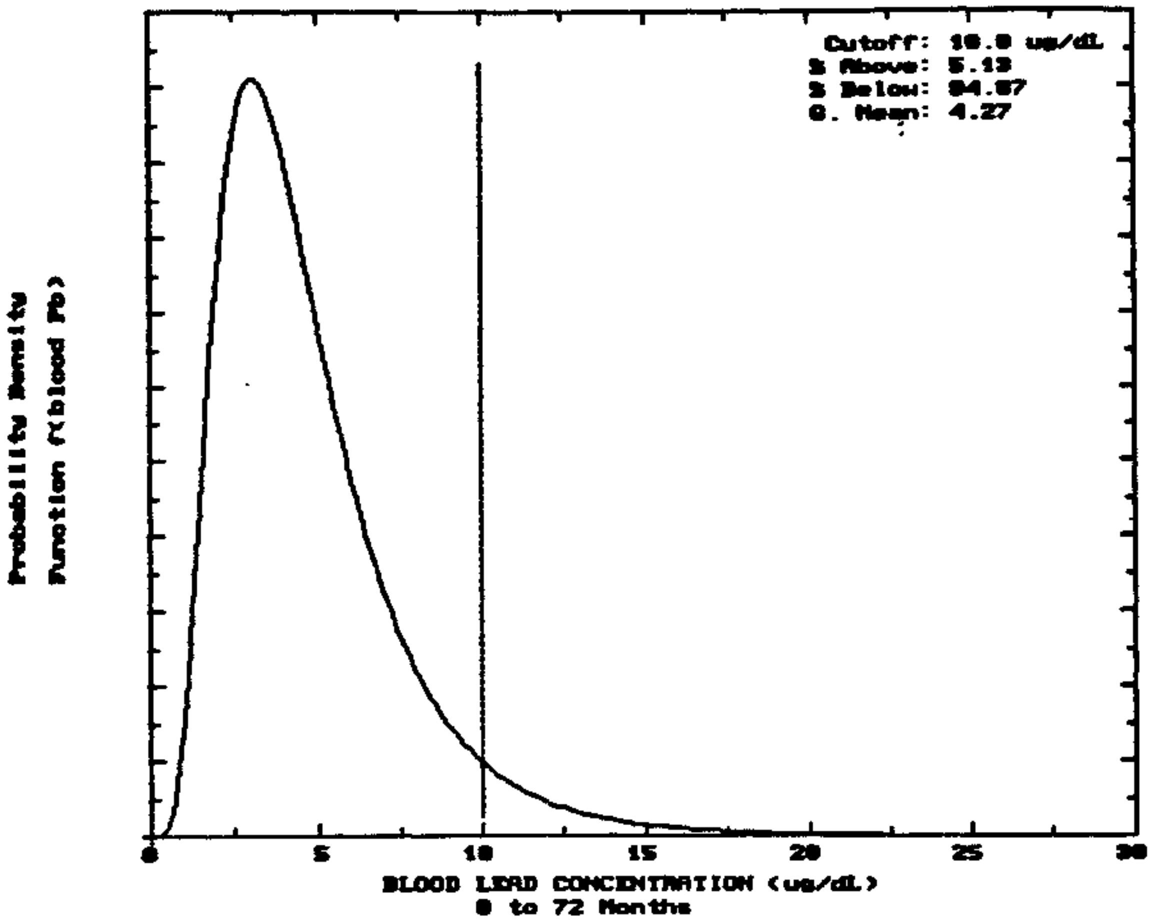
CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 1 Sensitivity Analysis	Figure No. 4-16



Model Parameters

Soil = 240 mg/kg
Dust = 141 mg/kg
Water = 16.3 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

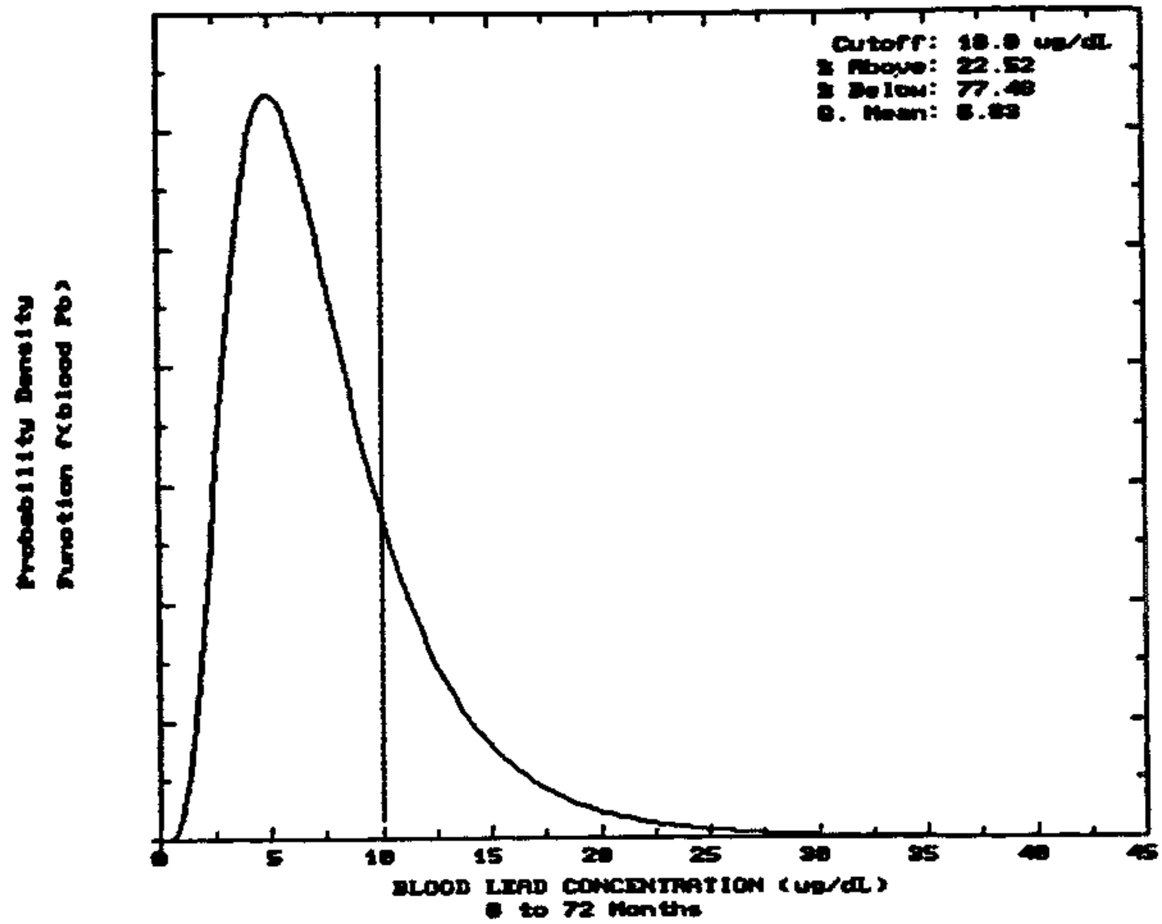
CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 2 Sensitivity Analysis	Figure No. 4-17



Model Parameters

Soil = 336 mg/kg
Dust = 141 mg/kg
Water = 16.3 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

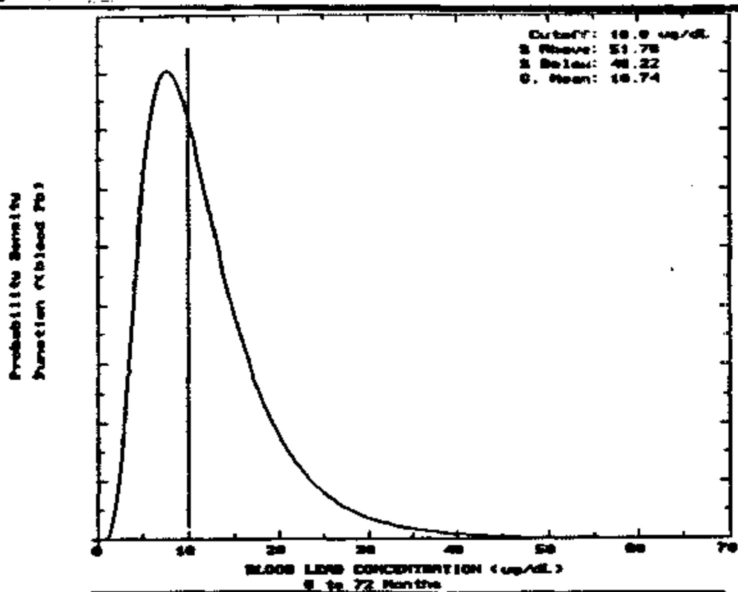
CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 3A Sensitivity Analysis	Figure No. 4-18



Model Parameters

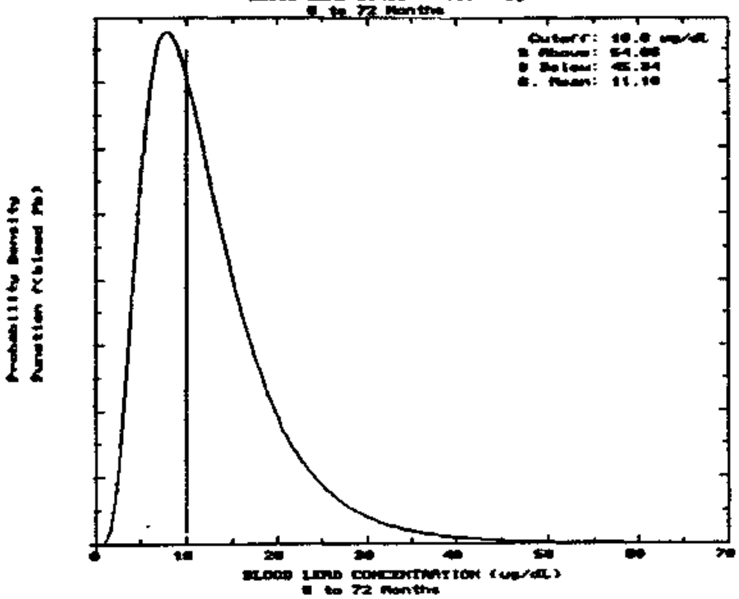
Soil = 1007 mg/kg
Dust = 141 mg/kg
Water = 16.3 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 3B Sensitivity Analysis	Figure No. 4-19



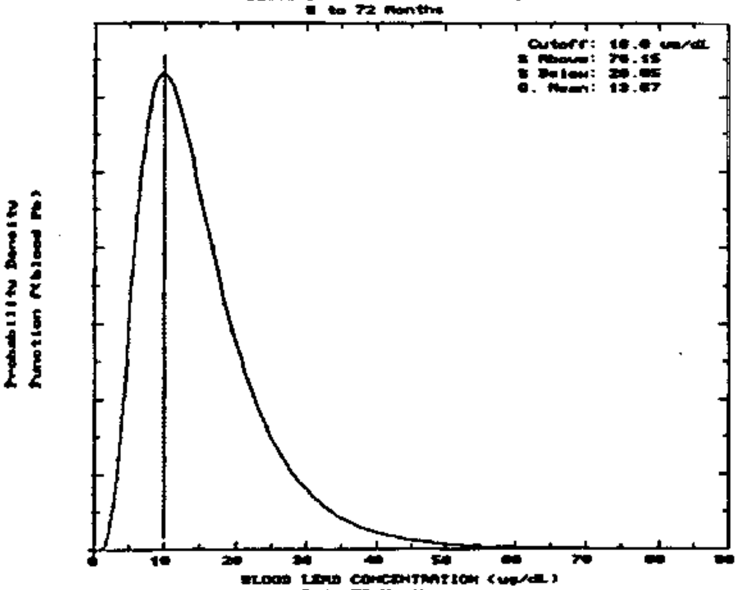
Model Parameters

AREA 2
Soil=240 mg/kg
Dust=1748 mg/kg
Water=6.0 ug/L
Maternal PbB= 7.5 ug/dL
GSD=1.7



Model Parameters

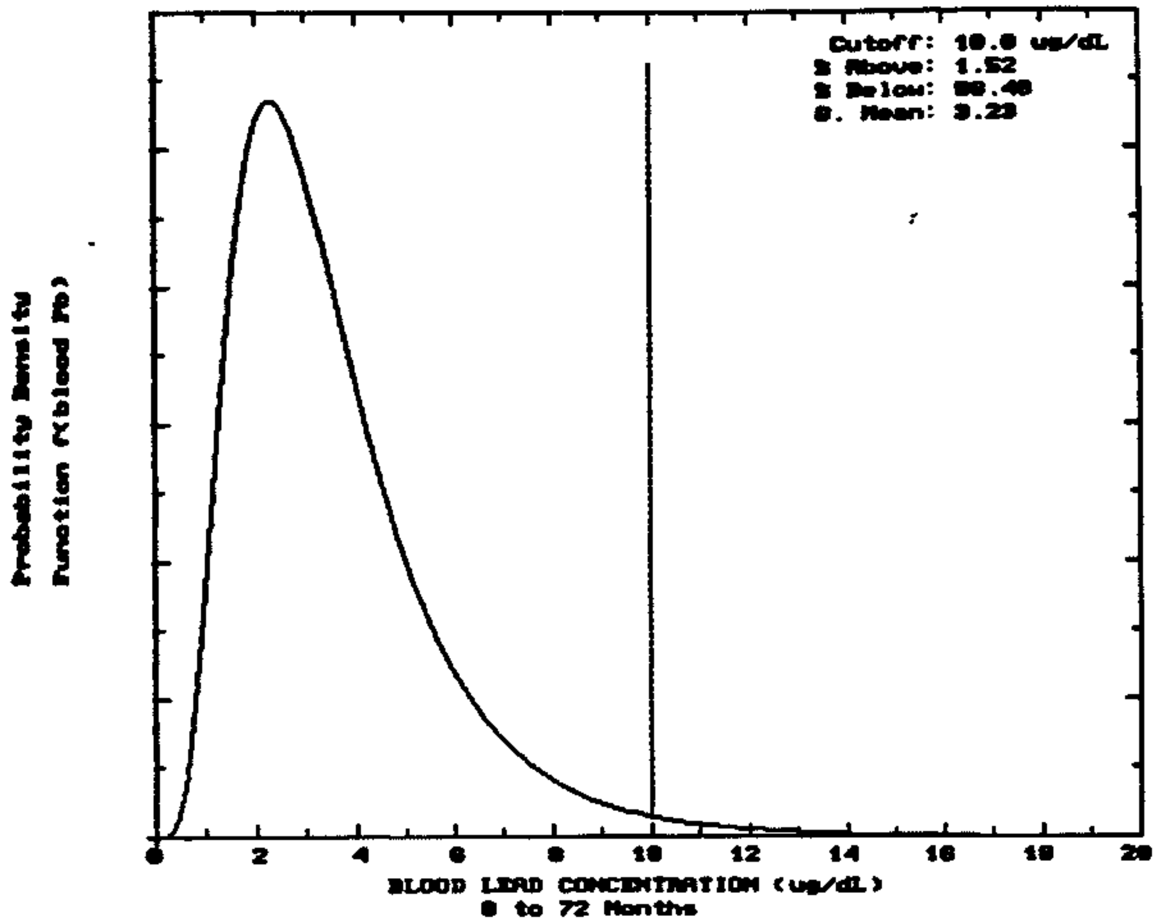
AREA 3A
Soil=336 mg/kg
Dust=1748 mg/kg
Water=6.0 ug/L
Maternal PbB= 7.5 ug/dL
GSD=1.7



Model Parameters

AREA 3B
Soil=1007 mg/kg
Dust=1748 mg/kg
Water=6.0 ug/L
Maternal PbB= 7.5 ug/dL
GSD=1.7

CDM *Dallas, Texas*	Dallas Housing Authority Site	BLOOD LEAD CONCENTRATIONS IN AREAS 2,3A AND IN 3B DUST 1748 (ug Pb/g)	Figure No. 4-20



Model Parameters

Soil=93 mg/kg
Dust=141 mg/kg
Water=6.0 ug/L
Maternal PbB= 7.5 ug/dL
GSD=1.7
Diet= 0.1 ug Pb/g Fish - 50% of all Meat

CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead Concentrations in Area 1 Diet 0.1 ug Pb/g Fish	Figure No. 4-21

4.7 UNCERTAINTY

4.7.1 EXPOSURE PATHWAYS AND RECEPTORS

Several exposure pathways identified in Figure 4-1 were omitted from the quantitative analysis. These included ingestion of fish, produce, and groundwater from onsite; and dermal contact with groundwater or surface water/sediments. Analysis of these pathways indicates that they are incomplete or that it is unlikely that they would contribute significantly to total lead exposure. Any underestimation of site-related exposure from these pathways is expected to be small.

Receptors for which exposure is quantified include children 0 to 6 years old and pregnant women whose blood lead could impact that of the developing fetus. Data indicate that young children are the subpopulation most at risk from lead exposure, even at low levels. Therefore, using this subpopulation as a basis for this risk assessment results in conclusions that are conservative and health protective for all individuals.

4.7.2 IUBK MODEL

Use of the IUBK model, as recommended by the EPA, offers a state of the art method by which the impact of lead exposure on blood lead levels may be estimated. As with any model, the IUBK model requires use of input parameters or default parameters, both of which have inherent uncertainties.

EPA documentation for the IUBK model states that the default values have been incorporated into the software to enable the user to run the model in the absence of site-specific data. The values reflect the current scientific consensus of central tendency for the value of each parameter and are not meant to be applicable to all exposure scenarios. For this analysis, various model default parameters were used including: age-specific inhalation and incidental soil ingestion rates, intake of lead in air and diet, absorption of ingested or inhaled lead, and maternal blood lead at the time of birth. In each case, these values were used in the absence of acceptable site-specific data. Any underestimation of site-related exposure from use of these parameters is expected to be small. When more reliable empirical data were available, parameters were input to allow for a more conservative analysis (e.g. input of a more conservative GSD value).

4.7.3 INPUT PARAMETERS

Exposure point concentrations were input to the model for all media except air. Point concentrations for soil lead for each area were conservatively estimated as the 95 percent upper confidence limit on the geometric mean. This is in accord with recommended EPA methodology for data which are log normally distributed. Sample numbers for lead in tap water and house dust were insufficient to allow analysis of distribution. Therefore, the arithmetic mean of lead levels in tap water and house dust samples were input to the model. A comparative analysis, using the maximum detected lead level in tap water was also performed, as well as an analysis using soil lead levels from the fenced area. Any underestimate in exposure resulting in use of the arithmetic mean values is expected to be small. Use of the 95 percent probability curves as output from the model would be expected to compensate for any underestimate in exposure.

5.0 TOXICITY ASSESSMENT OF LEAD

Lead is a ubiquitous metal in nature. Concentrations in rocks and soils from natural sources range from 10 to 30 mg/kg. High concentrations of lead are usually found in conjunction with cadmium, zinc, and silver ores. Lead is widely used in industry because of its softness, resistance to corrosion and radiation, and high density. Major uses of lead have been in batteries, as an additive in gasoline, as a pigment in paint, in solders, and in other alloys. The combustion of leaded gasoline has been the major source of environmental pollution. Because of its extensive use, the potential for exposure to lead is great.

5.1 TOXICOKINETICS

Absorption of lead from the gastrointestinal tract is estimated at 10-15 percent for adults. For young children, absorption of dietary lead may be much greater (~50 percent) (Hammond 1982). Absorption of lead from soil is probably less, and may be in the range of 25-30 percent (Drill et al. 1979, USEPA 1990b in ATSDR 1990). Essentially 100 percent of the lead deposited in the deep lung following inhalation is eventually absorbed. Respiratory uptake in children appears to be greater than in adults on the basis of body weight. Once absorbed, lead is stored in the body in kidney, liver, and bone where it may remain for long periods of time. Lead is primarily excreted by the kidneys into the urine, with lesser amounts eliminated via biliary excretion (USEPA 1984a).

5.2 QUALITATIVE DESCRIPTION OF HEALTH EFFECTS

The following information has been summarized from USEPA (1984a, 1989b), and ATSDR (1990). Lead has diverse biological effects in humans and animals. Considerable data exist on the effects of lead exposure in humans, and these effects are generally related to a direct measure of human exposure (e.g., blood lead levels). Currently, USEPA is refining an uptake biokinetic model for use in predicting blood lead concentration from intake of lead by various routes and from various media.

A major problem associated with lead exposure is the ubiquitous nature of the compound. Unlike many other contaminants for which exposure may be related to a specific route or situation, substantial background lead exposure occurs, primarily through diet and drinking water. This background exposure is an important determinant of blood lead level, and must be considered when additional significant exposure routes are identified.

Major toxic effects caused by chronic, low-level exposure to lead are alterations in the hematopoietic and nervous systems. In addition, low levels of lead in blood appear to be associated with small increases in diastolic blood pressure, and higher doses of lead can produce damage to kidney, G.I. tract (colic), liver, and endocrine glands (Tsuchiya et al. 1978, ATSDR 1990). Heme synthesis is inhibited by the effects of lead on several steps in the biosynthetic pathway. Specifically, lead stimulates delta-aminolevulinic acid synthetase (ALA-S), thereby increasing the production of delta-aminolevulinic acid dehydrase (ALA-D). Lead also inhibits ALA-D, thereby reducing production of porphobilinogen. Stimulation of ALA-S and inhibition of ALA-D lead to accumulation of ALA. Finally, lead inhibits ferrochelatase (heme synthetase), thereby inhibiting insertion of iron into the protoporphyrin ring. This in turn leads to the generation of zinc protoporphyrin (ZPP) due to substitution of zinc for iron in the porphyrin moiety. ZPP remains in erythrocytes throughout their lifetimes in blood and can be used as a clinical sign of recent lead exposure (ATSDR 1990). No threshold has been identified for this effect on heme production. Decreased heme production may result in significantly decreased hemoglobin production and anemia when exposures are large enough. Decreased heme production can also have deleterious effects on other heme-containing proteins, such as cytochrome P450, which detoxify certain chemicals in the body. Impaired heme synthesis has been reported in adults at levels of less than 30 μg/dL lead in the blood (USEPA 1984a).

Exposures to lead which result in levels of lead in the blood (PbB) of over 80 μg/dL in children and over 100 μg/dL in sensitive adults can cause severe, irreversible brain damage, encephalopathy, and possibly death. Persons with these high levels may be asymptomatic or show only slight signs of intoxication, but rapid deterioration can occur. In children, permanent learning disabilities are seen at these levels, even if there are no overt signs of lead poisoning (USEPA 1984a).

At lower blood lead levels, effects on the nervous system can be much more subtle. At blood lead levels as low as 30 to 70 μg/dL in adults, nerve conduction velocities can be reduced, and these effects can lead to neuromotor dysfunction in the extremities (foot-drop and wrist-drop syndromes). In children, significant deficits in IQ and behavioral indices were noted in children with pre- and/or postnatal blood levels of 70 μg/dL extending down to at least 10-15 μg/dL. Accompanying these low level effects on cognitive function were retardation of bone growth and hearing deficits. As with inhibition of heme synthesis, there has been no indication of a threshold for lead effects on the nervous system in data from epidemiologic studies. Thus, it is possible that adverse effects could occur at blood lead levels less than 10-15 μg/dL. Although there is still some controversy over the interpretation of effects in children with the lowest blood lead levels, there seems to be a general consensus that very low blood lead levels in young children may produce undesirable effects and attempts should be made to reduce lead exposure prenatally and in the youngest age groups as much as possible.

Other adverse effects are associated with exposure to low levels of lead. Slow nerve conduction in peripheral nerves has been seen in adults at 30-40 μg/dL blood lead levels (PbB); altered testicular function was observed in men with PbB levels as low as 40-50 μg/dL; and renal dysfunction has been associated with PbB levels as low as 40 μg/dL (USEPA 1984a).

The voluminous literature on lead is difficult to summarize briefly. The Toxicological Profile for Lead (ATSDR 1990) includes over 520 references and is not comprehensive. The above synopsis is taken from the following reviews: USEPA 1984a, USEPA 1989b, and ATSDR 1990.

5.3 QUANTITATIVE DESCRIPTION OF HEALTH EFFECTS

Oral ingestion of certain lead salts (lead acetate, lead phosphate, lead subacetate) has been associated with increased renal tumor frequency in rats (USEPA 1985a), but no quantitative estimate of excess cancer risk has been performed by the Carcinogen Assessment Group of USEPA. USEPA (1985b) has noted that the available data provide an insufficient basis on which to regulate lead acetate, lead phosphate, and lead subacetate as human carcinogens. However, applying the criteria described in USEPA's Guidelines for Carcinogenic Risk Assessment (USEPA 1986a), these lead salts have been classified by USEPA (1985b) in Group B2 — Probable Human Carcinogen. This category applies to agents for which there is inadequate evidence from human studies and sufficient evidence from animal studies.

The current maximum contaminant level (MCL) for lead (at source) is 0.005 mg/liter (USEPA 1991c). The Treatment Technique Action Level of 0.015 mg/liter was recently finalized (June 1991) by the Office of Drinking Water (USEPA 1991c). The maximum contaminant level goals (MCLGs) for lead at the source and at the tap are both zero.

The USEPA Office of Drinking Water issued a draft health advisory of 20 μg/day for all extended periods of exposure (USEPA 1985a). Blood levels above 15 μg/dL were identified as the level of concern, and fetuses and infants under 2 years of age are the sensitive subpopulation. In order to protect the fetus, it was considered advisable to limit the blood lead level in woman of child-bearing age to below 15 μg/dL since studies indicate that the ratio of fetal/maternal blood lead values is close to 1:1 (Hubermont et al. 1978 as cited in USEPA 1985a).

The Clean Air Act National Ambient Air Quality Standard for lead is 1.5 $\mu g/m^3$. This standard is currently being evaluated for revision (USEPA 1985c).

Acceptable intakes for chronic or subchronic periods of exposure were not calculated for either inhalation or oral ingestion in the Health Effects Assessment Document (USEPA 1984b) because the general population is already accruing unavoidable background exposures through food, water, and dust. Any significant increase above background exposure would represent a cause for concern. In lieu of AICs or RfDs, USEPA is currently refining the computer model for prediction of blood lead levels in children exposed to lead from a variety of sources (USEPA 1991b).

At present, human health criteria for lead in soil have not been established in the United States. The United Kingdom Directorate of the Environment has developed a tentative guideline of 550 ppm for lead in soil in residential areas (Smith 1981). Vernon Houk of the Centers for Disease Control has been quoted as indicating that levels of lead in soil of 300-400 ppm are acceptable based on studies of childhood lead poisoning (Miekle et al. 1984).

No RfC is available for lead, and, as discussed above, it is not clear that there is a threshold below which there are no risks from exposure to lead. Since RfCs are based on the assumption that such a threshold exists, estimation of an RfC for lead is not appropriate at this time.

However, the impact of inhalation of lead can be assessed by the use of the IUBK model discussed above. This model allows for the impact of lead in air on blood lead levels in children to be estimated. Thus, estimated blood lead levels can then be compared to target blood lead concentrations to assess possible risks.

The American Conference of Governmental Industrial Hygienists (ACGIH 1986) recommends a time-weighted average Threshold Limit Value (TLV) of 0.15 mg/m^3 lead in air.

SUMMARY OF LEAD CRITERIA		SOURCE
USEPA Carcinogen Classification	Group B2	USEPA 1991a,b
Oral RfD	Not available	USEPA 1991a,b
Inhalation carcinogenic potency	Not available	USEPA 1991a,b
Oral carcinogenic potency	Not available	USEPA 1991a,b
Maximum contaminant level (MCL)	0.05 mg/liter	USEPA 1991c
Treatment Technique Action Level (TT)	0.015 mg/liter	USEPA 1991c
Maximum Contaminant Level Goal (MCLG)	0 mg/liter	USEPA 1991c
USEPA Drinking Water Health Advisories	Not available	USEPA 1991c
Ambient Water Quality Criteria (AWQC)	Varies with hardness e(1.273[ln(hardness)]-4.705)	USEPA 1980
National Ambient Air Quality Standard (NAAQS)	1.5 $\mu g/m^3$	

5.4 UNCERTAINTY

The EPA suggested method for assessing potential noncarcinogenic effects from exposure to lead is a departure from the normally used method and is unique to this chemical. Further, this method, i.e. the IUBK model, does not estimate a no-adverse-effect-level but estimates the total exposure and resulting blood lead level for an individual from all routes of exposure. As previously discussed, the model, and associated input parameters, has certain inherent uncertainties. An additional uncertainty is the choice of a threshold value or criteria for an acceptable blood lead level. The threshold for neurological effects in young children is uncertain. Studies of these effects are complicated by the fact that the probable threshold, if one exists, is near the present analytical detection limit for blood lead.

The potential for carcinogenic effects following lead exposure is also uncertain. USEPA has classified certain lead salts as Group B2 - Probable Human Carcinogen, indicating sufficient evidence from animal studies and inadequate evidence in humans. USEPA has not, however, derived a unit potency estimate for lead which would allow quantification of carcinogenic risks. Due to the numerous uncertainties concerning the carcinogenic potency of lead, USEPA recommends that a numerical estimate not be used (USEPA 1991a).

6.0 RISK CHARACTERIZATION

Risk characterization combines the results of the exposure and toxicity assessments and draws conclusions on the magnitude of human health risks imposed on potential receptors from exposure to chemicals of concern. Section 6.1 discusses criteria used for the comparison of exposure and toxicity data. Section 6.2 summarizes potential risks to young children, and Section 6.3 discusses these results in detail. Section 6.4 considers uncertainties in the risk assessment and is broken down into subsections which address uncertainties in the IUBK model and an evaluation of current blood lead data available for children living in and near the DHA site. Risk assessment conclusions are summarized in Section 6.5.

6.1 SELECTION OF CRITERIA FOR ACCEPTABLE BLOOD LEAD LEVELS

In order to evaluate the likelihood of adverse effects from exposure to lead and generate action levels using the IUBK model, criteria must be established which represent "unacceptable" exposure in a population. EPA has provided no firm guidance on this subject. In 1985, the U.S. Centers for Disease Control (CDC) established a health advisory guideline defined as a blood lead level of 25 μg/dL or above combined with an erythrocyte protoporphyrin level of 35 μg/dL or above (CDC 1985).

Since that time, a guideline level of approximately 10 μg/dL has been suggested by several public health agencies. EPA has identified a range of 10 to 15 μg/dL as the lower bound level for onset of early adverse effects (USEPA 1990c). In addition, the EPA's Science Advisory Board has identified 10 μg/dL as the maximum level in all children to be considered "safe", based on its expert committee's report (USEPA 1990c). The CDC is also in the process of redefining its guideline value. Therefore, a criteria blood lead level of 10 μg/dL is used in this analysis.

In this report, a RME for lead is taken to be represented by the 95th percentile of the blood lead distribution predicted by the model. The 95th percentile is assumed to be the type of upper range value sought by EPA in defining the RME. When this 95th percentile of blood Pb concentrations falls at or above the criteria value (10 μg/dL), exposure is assumed to be excessive. Subsequently, when setting action levels, soil lead concentrations were chosen so that model predictions result in no more than 5 percent of the values exceeding 10 μg/dL (Section 7.0).

6.2 MODEL PREDICTIONS OF BLOOD LEAD LEVELS

Figures 4-12 through 4-15 illustrate predicted distributions of blood lead concentrations for young children in Areas 1, 2, 3a and 3b. Parameters used to generate these results are listed on each figure and are thought to be those that would be most applicable to the concept of RME. For these areas, the model predicted the percent of children expected to have blood lead levels exceeding 10 μg/dL as follows:

- 0.61 percent in Area 1
- 1.61 percent in Area 2
- 2.53 percent in Area 3a
- 16.4 percent in Area 3b

More than 5 percent of children who might live in Area 3b in the future could have blood lead levels exceeding 10μg/dL. Based on the criteria developed above (Section 6.1), potential lead exposures are unacceptable in this area.

6.3 RESULTS AND POTENTIAL EXPOSURE

Results do not indicate potential for current excessive exposure from the three major site-related sources, soil, indoor dust and tap water, in areas currently used for public housing. These areas include Areas 1 and 2 described earlier in the document. Lead levels in soils for all inhabited areas on the DHA site are generally low, and comparable to background concentrations in many urban situations. One small area of the site contains a few locations with lead levels slightly elevated above probable background (Area 2 in this assessment). Even so, predicted blood lead levels for children living within this area fall well below the criteria for excessive exposure established in this assessment (Section 6.1).

Lead in indoor dust was found to be low for all occupied units sampled, indicating that current DHA efforts to modernize and maintain apartment units is effective at minimizing indoor dust levels. Complete ("gut") rehabilitation of apartments, which involves removing all interior materials down to the wall studs, is expected to eliminate problems of indoor dust by removing all painted surfaces and replacing them with new materials painted with paints containing little or no lead. "Make-ready" efforts of damp cleaning all interior surfaces, and painting walls and trim are expected to greatly reduce dusting of lead paint from walls of units awaiting complete rehabilitation. The low lead levels in dust in occupied units is encouraging since it suggests that this source of lead exposure is being effectively controlled in DHA housing.

Tap water lead levels were generally low, although the average concentration in the samples analyzed was slightly higher than the default in the IUBK model (6 vs. 4 $\mu g/L$). The highest concentration was 16 $\mu g/L$ in a first draw sample from a non-rehabilitated unit. The average lead concentration in water from the DHA area is not expected to greatly influence blood lead levels. Contributions to blood lead from water were generally less than 18 percent of total lead intake in occupied areas of the site.

At the highest tap water lead concentration found, this percentage increases to about 30 percent of total lead intake. For children in Area 2, this would increase the predicted percentage of children with blood lead levels over ten from 1.6 to 3.6 percent (Section 4.6.3). This increase still does not result in predicted lead exposures in excess of criteria; but, as discussed below, it could put a small percentage of children with nutritional deficiencies and/or unusually high water consumption rates at risk for blood lead levels above 10 $\mu g/dL$.

It should be noted that the current regulatory standard for lead in tap water is 15 $\mu g/L$. When this lead level is exceeded in a percentage of homes within a single water distribution system, the water supplier must take steps to make the water less corrosive, thus reducing leaching of lead from plumbing.

Certain areas of the site, currently uninhabited, have environmental lead concentrations in soil and dust that may impose a risk of excessive lead exposures on future residents. In Area 3, especially zones outside the area of the past soil removal action, the IUBK model predicts that blood lead levels in children would exceed the established criteria. Even if one assumes that apartments in this area are completely rehabilitated, exposures to lead in soil would result in more than 5 percent of children with blood lead levels in excess of 10 $\mu g/dL$.

Indoor dust concentrations in unoccupied apartments in Area 3 are high, and reflect the delapidated condition of these units. Interior paint is in poor condition, and is contributing to indoor dust. Average dust levels in these apartments are high, and hypothetical exposures in children might result in the majority with blood lead levels exceeding the criteria. Such exposures are not realistic since extensive rehabilitation of apartments in Area 3 would be necessary prior to habitation. However, these results do emphasize the importance of continuing cleaning and painting apartments. Ultimately, all units should be completely rehabilitated to remove the potential indoor lead source permanently.

Exposure due to inhalation of contaminated air is not expected to contribute significantly to lead uptakes. Maximum detected air lead concentrations in the DHA area have not exceeded 0.2 $\mu g/m^3$ since the late 1980s, and average air lead levels have been below this level over this same time period. At an air concentration of 0.2 $\mu g/m^3$, air exposure contributes less than 1 percent to total lead uptake.

Ingestion of contaminated fish from Fishtrap Lake is also unlikely to be a significant source of lead exposure. Concentrations in fish tissue are low, and a "worst case" analysis using the IUBK model (Section 4.6.3) indicates that even if half of all meat consumed was replaced by Fishtrap Lake fish, the effects on blood lead levels would be very small.

6.4 UNCERTAINTY

6.4.1 USE OF IUBK MODEL FOR ASSESSING LEAD EXPOSURES

The EPA - suggested method for assessing potential noncarcinogenic effects from exposure to lead is a departure from the normally used method, and is unique to this chemical. Further, this method (i.e., the IUBK model) does not estimate a no-adverse-effect-level but estimates the total exposure and resulting blood lead level for an individual from all routes of exposure. As previously discussed, the model, and associated input parameters, has certain inherent uncertainties. An additional uncertainty is the choice of a threshold value or criteria for an acceptable blood lead level. The threshold for neurological effects in young children is uncertain. Studies of these effects are complicated by the fact that the probable threshold, if one exists, is very near the present analytical detection limit for blood lead.

The potential for carcinogenic effects following lead exposure is also uncertain. USEPA has classified certain lead salts as Group B2 - Probable Human Carcinogen, indicating sufficient evidence from animal studies and inadequate evidence in humans. USEPA has not, however, derived a unit potency estimate for lead which would allow quantification of any carcinogenic risks. Due to the numerous uncertainties concerning the carcinogenic potency of lead, USEPA recommends that a numerical estimate not be used (USEPA 1991a).

6.4.2 MEASURED BLOOD LEAD LEVELS IN THE WEST DALLAS AREA

6.4.2.1 Description of Available Data

Citizens in West Dallas were offered blood lead screening by the City of Dallas during the last half of 1991. According to data provided to CDM by the City, 152 children ages 0 to 6 years were tested during this time. Children from several census tracts (2.02, 4.03, 4.05, 11, 12.02, 13.02, 16, 42, 43, 46, 55, 60.02, 67, 69, 73.01, 78.17, 87.01, 87.04, 88.02, 90.02, 98.01, 101.01, 101.02, 102, 103, 104, 105, 106, 107.02, 108.01, 109, 110.01, 111.04, 111.05, 114.01, 122.02, 123, 165.01, 169.01, 190.18) are represented in this data set. Census tracts comprised wholly or in part of DHA properties are 102, 103, and 104. Thirty-eight children living in these census tracts were screened during 1991. Census tracts immediately adjacent to DHA properties include 101.01 and 105. Blood lead concentrations from 49 children living in these tracts are reported in the data set, giving a total of 87 children living in the census tracts including and adjacent to DHA properties. Data on individuals with elevated (> 10 μg/dL) blood lead are provided in Table 6-1. Quality control information provided by the City indicate that blood lead measurements made during the screening are probably reasonably accurate (Table 6-2).

The blood lead screening was voluntary, and therefore must be assumed to be biased. That is, it is likely that many individuals who took advantage of the screening program came because they believed

TABLE 6-1

CHILDREN WITH ELEVATED BLOOD LEAD LEVELS

IDENTIFIER	AGE	BLOOD LEVEL	CENSUS TRACK
A	5.9	10	104
B	5.2	15	104
C	4.1	12	104
D	5	11	104
E	4.5	16	102
F	2.2	16	102
G	1.6	10	103
H	2.9	24	102
H2	4	21	102
I	2.4	10	105
J	1.1	10	105
K	2.4	12	105
L	5.1	11	105
M	5.3	10	105
N	1.7	15	105
O	3.6	14	105
O2	6	11	105
P	5.9	11	105
P	4.9	13	105
Q	2.5	11	105
R	4	11	101.02
S	5.3	12	101.01
T	1.8	10	101.01
U	3.7	15	101.01

TABLE 6-2

LAB CODE	METHOD	RESULTS(μg/dL whole blood)					
		A	B	C	D	E	F
103	Flameless AA	3	2	47	11	14	8
105	ASV	4	3	46	9	12	7
106	ASV	3	4	46	14	16	11
107	Flameless AA	2	2	46	11	15	10
108	MIBK Extrac.	3	2	45	12	15	10
109	Flameless AA	4	2	49	11	16	11
110	Delves cup	5	4	49	13	17	13
147	Flameless AA	1	1	46	11	14	9
199	Delves cup	3	2	48	11	15	9
200	Delves cup	2	1	50	11	15	10
Number of sample measurments		10	10	10	10	10	10
Mean (target value)		3	2	47	11	15	10
Standard deviation		1.2	1.1	1.7	1.3	1.4	1.7
RSD (%)		38.5	46.1	3.6	11.8	9.2	17.2
Acceptable range:							
Upper limit		7	6	52	15	19	14
Lower limit		0	0	42	7	11	6

Table title: LEAD PROFICIENCY TEST QUALITY CONTROL STATISTICAL SUMMARY — REFERENCE LABORATORY RESULTS

481\Dallas Housing/Tables/6-2.tbl
6/10/92 mm

that they or their children might be exposed to significant amounts of lead. The 1990 census data indicate that there may have been as many as 1580 children ages 0 to 6 years living in census tracts 101.01, 102, 103, 104, and 105 at the time of the screening. This suggests that only about 7 percent of all children in the area were tested. The small percentage supports the conclusion that the data may be severely biased and should be interpreted with caution.

6.4.2.2 Children with Elevated Blood Lead Concentrations Living on or Adjacent to DHA Property

Table 6-1 indicates that nine children under age 6 living in the DHA area had blood lead levels at or above 10 $\mu g/dL$ in 1991. The approximate locations of the homes for each of these children are provided in Figure 6-1. Similarly, 14 children living in adjacent census tracts 101.01 and 105 had blood lead concentrations at or above 10 $\mu g/dL$. Again, locations of homes for these children are identified in Figure 6-1. The total of 23 children represents all 0 to 6 years-olds with blood lead levels at or above 10 $\mu g/dL$ who resided on or adjacent to DHA property in 1991. Comparing this number with the total expected for young children living in this area suggests that 1.4 percent of children had elevated blood lead concentrations. This estimate, however, cannot be accepted as accurate because of problems with bias as discussed above. The actual percentage of children with elevated blood lead levels living on or near DHA properties could be either higher or lower.

6.4.3 EVALUATION OF INDIVIDUAL CHILDREN RESIDING IN DHA HOUSING

A major limitation to the blood lead screening is a lack of detailed environmental data for children with high blood lead levels. To adequately assess possible sources of exposure in these children, it is necessary to have information on lead exposures via soil, house dust, drinking water, diet, maternal blood lead and any unusual exposures (e.g., a parent whose occupation or hobbies include working with lead). In the absence of data collected from homes of individual children, CDM geographically correlated approximate locations of children's homes with information on soil, house dust and drinking water gathered during its field investigations.

Children in Figure 6-1 were grouped according to location into four subsets. Children A through D live south of Bickers between the 2300 and 2600 blocks. Children E and F live north of Bickers along Fishtrap Road. Child G lives north of Bickers and further east, near the junction of Pointer and

Rupert Streets. Children H and H2 live along Rupert, south of Bickers, in the area designated as Area 2 in this assessment. Children in a single group were expected to live in similar exposure environments because of their close geographic locations.

6.4.3.1 Children A through D

Children A through D live in a renovated section of the West Dallas housing complex. Surface soil concentrations (0 - 1 inch) measured in this area can be taken from data from grid points PG-70, -83, -84, -96 to -100, -114, -115, -117, -118, -133 to -136, -154, -155, and -173 (Table 6-3). The range of lead concentrations at these sampling points is 20 to 138 mg Pb/kg, and the arithmetic average is 62. These values are similar to those obtained from "background" samples taken from surface soil at two other DHA properties, Audelia Manor and Forest Green. For children living in this area, soil concentrations are apparently not different from levels found in nearby urban settings.

Indoor dust levels for renovated DHA housing can be estimated from the results of indoor dust sampling (Table 4-6). Dust samples 15, 16, 20 to 22 and 33 all came from completely rehabilitated apartments and can be used to estimate likely dust lead concentrations for this area. The arithmetic average concentration in dust is expected to be 149, with a range of 129 to 191 mg/kg. As previously discussed, dust levels were estimated conservatively, due to the small numbers of samples for which direct measurements of lead concentration were available. The estimated indoor dust concentration is likely to overestimate actual concentrations.

As with soil, dust lead concentrations are low and near expected background for soils. Contributions to total lead intake from such concentrations are expected to be small.

Drinking water exposures can be estimated using the tap water concentrations of lead found in completely renovated units, TW-1, -2 and -4. These values, 11.1, 1.6 and 1.7 μg/L, respectively, suggest that lead exposures due to lead in tap water would be small. Even at a water concentration of 11.1 μg/L, the contribution of lead in water to total intake would be less than that expected from a normal diet.

TABLE 6-3

SOIL CONCENTRATIONS IN AREAS WHERE CHILDERN WITH BLOOD LEAD CONCENTRATIONS ABOVE 10 $\mu g/dL$ HAVE BEEN FOUND

SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)	SAMPLE ID	TOTAL LEAD (mg/Kg)
CHILDREN A-D[1]									
PG-039	75	PG-077	74	PG-094	45	PG-068	87	PG-092	41
PG-064	49	PG-081	44	PG-053	49	PG-079	52	PG-112	60
CHILDREN E-F									
PG-070	85	PG-115	21	PG-173	68	PG-114	51	PG-155	41
PG-085	120	PG-118	64	PG-083	20	PG-117	27		
PG-097	66	PG-135	52	PG-096	57	PG-133	27		
PG-100	126	PG-154	36	PG-098	53	PG-136	138		
CHILD G									
PG-163	67	PG-220	116	PG-165	73	PG-222	94		
PG-185	54	PG-240	215	PG-187	80				
CHILDREN H-H2									
PG-225	124	PG-260	181	PG-241	198	PG-257	247		
PG-242	233	PG-258	535	PG-243	45	PG-275	1408		

[1] Areas are defined in the text in Section 6.4.3.

481\DALLAS HOUSING\TABLES\6-3.tbl
6/10/92 mm

Overall, lead exposures for these four children from sources related to the site appear to be very small. Using the IUBK model in default mode except with soil (62 mg/kg), dust (149 mg/kg), water (11.1 μg/L) and a GSD of 1.7 as inputs, a geometric mean blood lead of 2.93 μg/dL is predicted, with only 0.98 percent of children expected to have blood lead levels as high as or higher than 10 μg/dL (Table 6-4). Such results suggest that elevated blood lead levels in these children are due to factors other than excessive levels of lead in soil, house dust, or drinking water. Since the latter are the only significant sources of exposure which might be site-related, elevated blood lead levels in children A - D are probably due to more generic factors unrelated to lead contamination from the RSR smelter, the use of lead-based paint and/or the use of lead solder for residential plumbing. Several explanations are consistent with existing data. This prediction of mean blood lead is also similar to that predicted by the IUBK model run completely in default mode (See Figure 6-2).

Some children may have behaviors which put them at greater risk for lead exposure. Children with unusual mouthing activity, for example, may ingest much larger amounts of soil than average. This, in turn, will lead to a higher than normal uptake of lead and a higher blood lead concentration. The IUBK model, run in default mode for all parameters except soil ingestion rate and GSD (1.7), predicts that children who consume twice as much soil (200 mg/d) as average (100 mg/d) will have an average blood lead level 1.5 times higher than normal, and the number of children with blood lead levels exceeding 10 μg/dL will increase from 0.98 to 8.34.

Nutrition may also increase risks for higher blood lead levels. Children who do not obtain sufficient iron in their diets may absorb lead much more efficiently than their peers. This can also lead to increased blood lead concentrations. Possible impacts of increased absorption are discussed in Section 7.2.

Children may receive significant exposure away from home while staying with relatives, or in a formal daycare facility. Older homes, or homes undergoing renovation, could be sources for lead from lead-based paints. Much of this area of West Dallas is old enough to have many homes with significant amounts of lead in paint. The scattered occurrences of children with elevated blood lead levels at sites substantially removed from the smelter (four in census tract 43, one in census tract 101.02, and two in census tract 106) is consistent with this suggestion.

TABLE 6-4

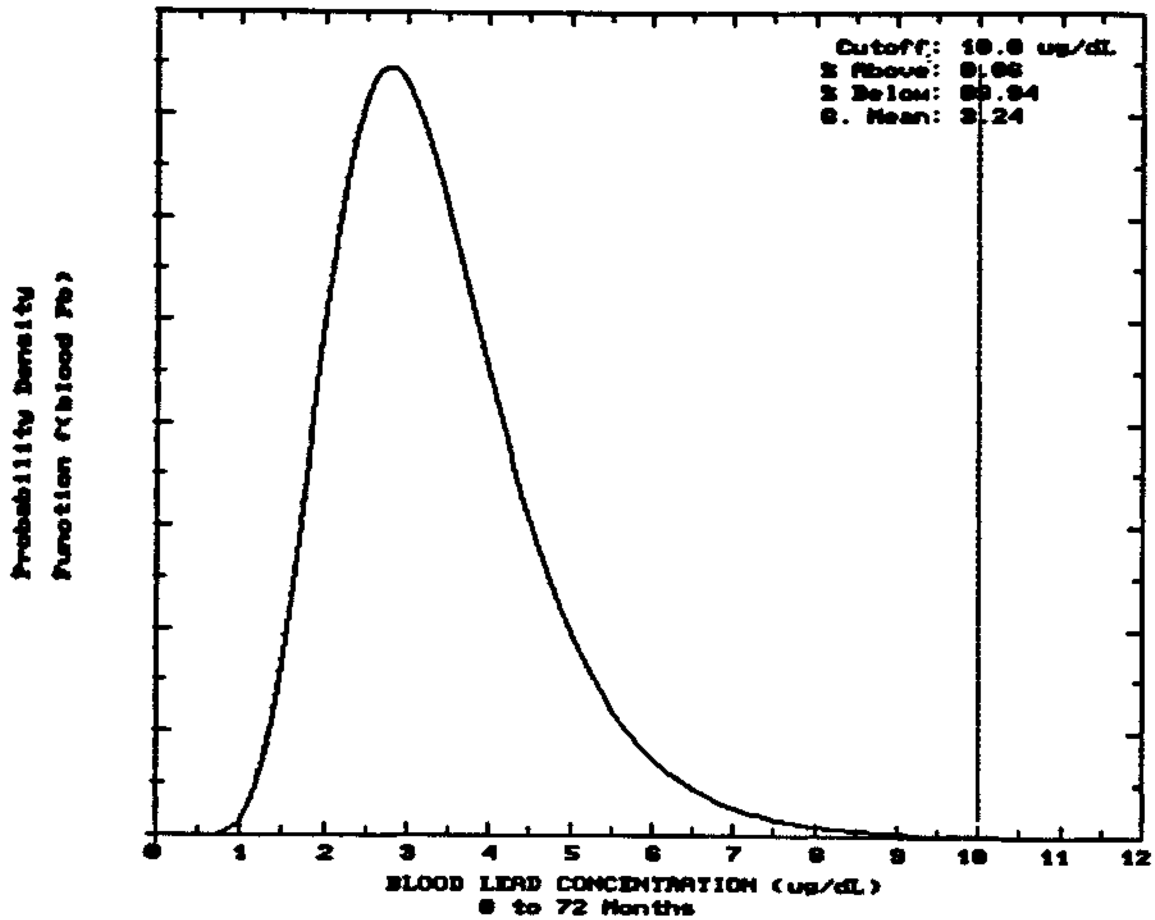
MODEL RESULTS
REHABILITATION UNIT

CALCULATED BLOOD Pb and Pb UPTAKES

Age (Years)	Blood Level (μg/L)	Total Uptake (μg/day)	Soil & Dust Uptake (μg/day)	Diet Uptake (μg/day)	Water Uptake (μg/day)	Paint Uptake (μg/day)	Air Uptake (μg/day)
0.5-1	2.73	7.39	3.30	2.94	1.11	0.00	0.04
1-2	2.62	9.10	3.30	2.96	2.77	0.00	0.07
2-3	2.71	9.70	3.30	3.40	2.89	0.00	0.12
3-4	2.79	9.66	3.30	3.29	2.94	0.00	0.13
4-5	2.89	9.66	3.30	3.18	3.05	0.00	0.13
5-6	2.93	10.08	3.30	3.38	3.22	0.00	0.19
6-7	2.99	10.50	3.30	3.74	3.27	0.00	0.19

SOIL CONSTANT CONCENTRATION used in model: 62.0 (μg Pb/g)
DRINKING WATER CONCENTRATION used in model: 11.10 (μg Pb/L)

481\Dallas Housing\Tables\6-4.tbl
6/10/92 mm



<u>**Model Parameters**</u>

Soil=200 mg/kg
Dust=200 mg/kg
Water=4.0 ug/L
Maternal PbB= 7.5 ug/dL
GSD=1.42

CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Distribution of Blood Lead Concentrations Default Model**	Figure No. **6-2**

Children may also have carried a substantial burden of lead acquired in another location with them when they moved into DHA housing. Follow-up questionnaires with families of children with high blood lead levels addressed the question of previous address, but the information provided is difficult to interpret. For example, it is not clear when the questionnaire is left blank if the family neglected to fill out the form, decided not to provide the information, or had not moved for an extended period. Also, it seemed that some forms were filled out to represent the person providing the information, rather than the child in question. Data are thus insufficient to assess this possibility on a child by child basis.

Overall, the questionnaires do provide some indication that families tend to make local moves. Of 17 questionnaires reporting previous addresses, 13 provided addresses on or near the DHA property. Since some areas west of the DHA property may have significant levels of lead in surface soils, it is possible that some high lead levels in children residing in DHA housing are due to previous exposure elsewhere.

Children may also have diets which are higher in lead than normal. For example, some children could rely to a greater extent on canned fruits and vegetables, rather than frozen or fresh. Although lead soldered cans are no longer produced in the U.S., imported cans may still be sealed with lead-based solder. A greater dependence on canned goods makes it more likely that imported canned goods will be consumed.

Finally, parents or other household members may have hobbies (e.g., stained glass, electronics) or occupations (e.g., battery manufacturing) that involve exposure to lead. Hobbies could release lead directly into the indoor environment and/or parents could bring substantial amounts of lead home on their work clothes. Either source could increase indoor dust lead concentrations and result in significantly increased lead exposure.

Whatever the source of lead exposure in children A - D, it is unlikely that their exposure is greater due to their residence in DHA housing. Levels of lead in the environment for these children is similar to that expected elsewhere in the Dallas urban area. These same children might be expected to have similar blood lead levels even if living in other areas in Dallas. In fact, if the source of the extra lead is either increased mouthing behavior or poor nutrition, completely rehabilitated housing may be preferred. Other housing in the Dallas area, if older than 20 years, could have substantial lead in interior wall and trim paint. This lead could have a significant impact on blood lead levels in children with high soil ingestion rates, or iron or calcium-deficient diets.

6.4.3.2 Children E and F

Surface soil samples taken near Fishtrap Road, north of Bickers include PG-39, -53, -64, -68, -77, -79, -81, -92, -94, and -112 (Table 6-3). The arithmetic average soil concentration from these locations is 57.6, with a range of 49 to 87. These levels are again similar to those associated with background in the Dallas urban area.

Homes for both children are in the area where complete rehabilitation of apartments has been completed. Exposures from either indoor dust or drinking water can be expected to be similar to those for children A - D. Since soil concentrations for this group are also similar to the first, excessive exposure is again expected to be due to sources not specific to the DHA property or its history of lead contamination.

6.4.3.3 Child G

Surface soil samples taken near the junction of Pointer and Rupert include PG-163, -165, -185, -187, -220, -222, and -240 (Table 6-3). The arithmetic average for this data subset is 100 mg/kg with a range of 54 to 215. This mean is slightly higher than those for the first two groups above, but still within the range of values associated with background (Section 3.4.1). The data subset contains one value (215 mg/kg) which is elevated above expected background, but still below levels which might trigger remedial action (Section 7.0)

The home for this child is in the area where complete rehabilitation of apartments has been completed. Exposures from either indoor dust or drinking water can be expected to be similar to those for children A - D. Since soil exposure concentrations for this child are also similar to the first, excessive exposure is again expected to be due to sources not specific to the DHA property or its history of lead contamination.

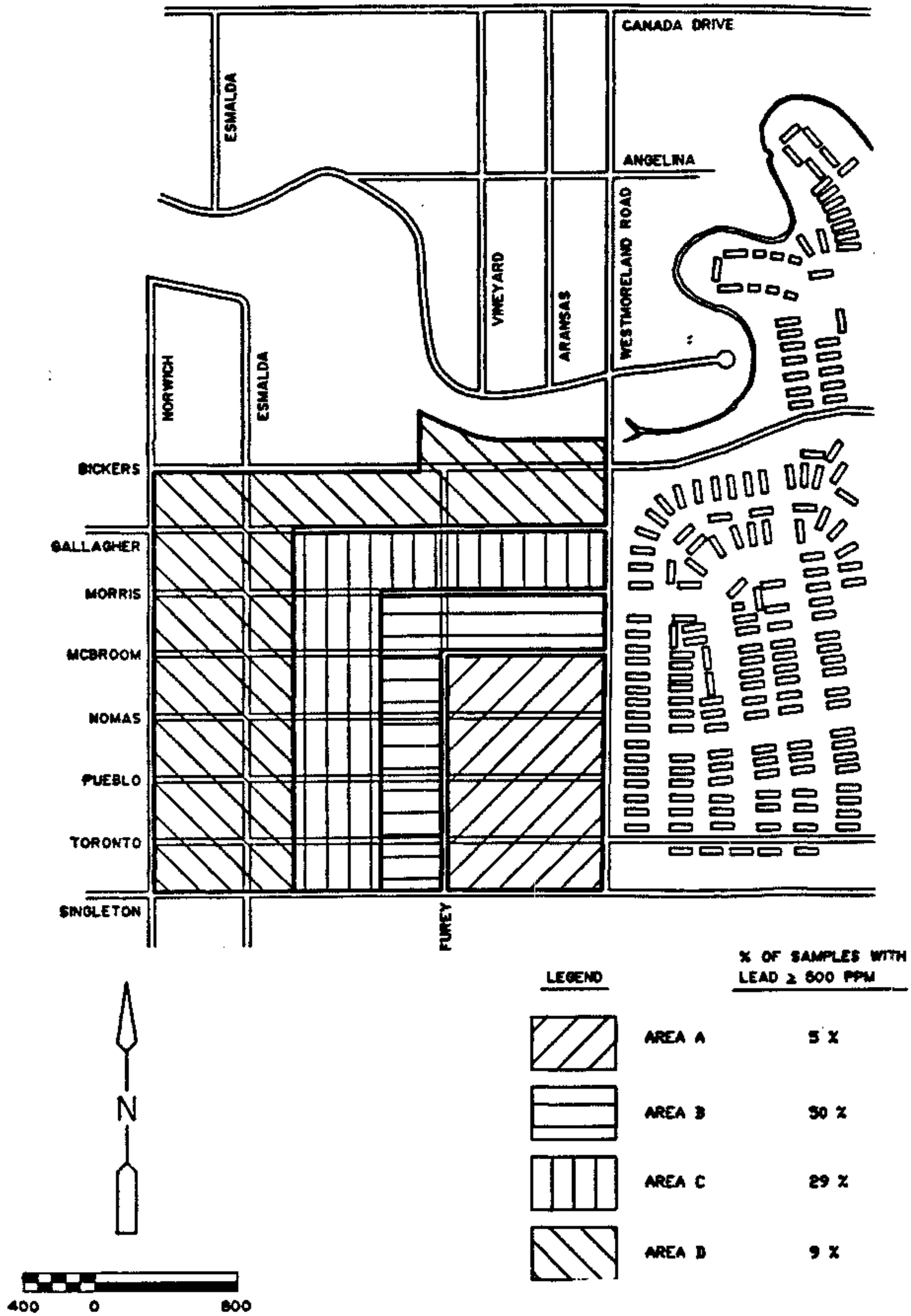
6.4.3.4 Children H and H2

Surface soil samples taken near these children's home include PG-225, -241, -242, -243, -257, -258, -260, and -275 (Table 6-3). The arithmetic average for this data subset is 374 with a wide range from 45 to 1481 mg/kg. The highest soil concentrations (1408 and 564) are certainly of concern, and it is theoretically possible that excessive exposure could be due to site-related lead in soil. The higher lead concentrations, however, actually occur in the unoccupied and fenced area of the property. It is unlikely that a very small child would be playing in these areas. Excluding the two higher values, the arithmetic mean soil concentration is 171 mg/kg.

6.4.4 EVALUATION OF CHILDREN WITH ELEVATED BLOOD LEAD LEVELS LIVING OUTSIDE DHA PROPERTY

Several children with elevated blood lead levels in census tracts 101.01 and 105 were identified in the blood lead screen. EPA has collected data in areas where some of these children live, but has refused to release this data to CDM, citing concerns for privacy. Lack of data prevents a more complete analysis of the exposure conditions for these children. However, it is possible to discuss the results of the screening in census tract 105 in a qualitative fashion, based on limited data summaries provided by EPA.

In census tract 105, 11 children with elevated blood lead levels can be divided into two groups. Children I - M reside in an area in which EPA has found some elevated levels of lead in soils. Figure 6-3 shows areas designated by EPA with associated percentages of soil samples with lead levels above 500 mg/kg. Children within this area could be exposed to higher soil lead concentrations and this may, in part, explain the higher blood lead concentrations found. Only 11 children participating in the blood lead screening, however, were reported living in the EPA areas of interest, providing a ratio of 5/11 or 0.45 of children with elevated blood lead levels to total children screened. Such a high ratio is unexpected. In Leadville, CO, soil concentrations ranging up into the 10's of thousands of mg/kg in residential areas were associated with less than 40 percent of children with blood lead levels exceeding 10 μg/dL (CDH 1989). It may be that only children whose parents had reason to suspect elevated lead exposures were tested. This seems likely since the issue of lead contamination in this area has been of public concern for some time.



CDM Dallas, Texas	Dallas Housing Authority Site	EPA Areas with Lead Concentrations > 500 ppm in Soil	Figure No. 6-3

Children N - Q reside north of the EPA areas of interest. These six children are expected to have exposures to lead due to soil and dust which are on average less than those of the first group. The EPA data suggests that the frequency of detections of lead levels in soil above 500 mg/kg decreases with increasing distance from the RSR smelter site. Since children N - S reside further from the site than children I - M, soil levels around their homes should be less. Indoor dust concentrations should also be less, since at least some lead in indoor dust is transferred in from outside. Thirty-one children were tested from this area, a ratio of 6/31 or 0.19. Again, the high ratio suggests bias in the screening data. It is interesting to note, however, that the percentage drops in an area where soil and dust concentrations are expected to be low. This is consistent with the assumptions used to address lead exposures in this assessment. The IUBK model assumes that even when soil/dust concentrations are low, soil/dust ingestion is a significant source of exposure to environmental lead.

6.4.5 SUMMARY

Blood lead screening data collected by the City of Dallas in the last half of 1991 are useful in assessing potential impacts of environmental lead exposure in West Dallas. By correlating locations of children with sampling data collected by CDM, potential sources of exposure can be evaluated semi-quantitatively. In general, sources of environmental exposure for children with elevated blood lead concentrations for soil, indoor dust and drinking waster were limited and within ranges associated with background in urban areas. It seems unlikely that the high blood lead levels for these children are associated with the specific exposure conditions for DHA property. Instead, excess lead uptake is probably associated with diet, nutritional deficiencies, parent's occupational exposure, body burden acquired from other (non-DHA) exposure settings and/or other unusual sources. None of these factors would be unique to the DHA setting, and high blood lead levels might be expected in these same children in any urban exposure setting.

6.5 CONCLUSIONS

Conclusions drawn from this analysis are as follows:

- There appears to be no justification for remediation of soil in Area 1. This is based on a soil lead level (upper confidence limit) that is only slightly higher than off-site background lead levels, and model results which estimate that less than 1 percent of children exposed to this soil might have blood lead in excess of 10 μg/dL. Continued rehabilitation of the interior of units is recommended since this has been found to decrease indoor dust lead levels.

- Although there are slightly higher levels of lead in Area 2, no excessive exposure is expected and no remediation of soil appears to be justified. This is based on model results which estimate that less than 2 percent of children exposed to this soil might have blood lead in excess of 10 μg/dL. Continued rehabilitation of the interior of units is recommended as previously stated.

- Soil Remediation is warranted in portions of Area 3 that exceed 500 mg lead/kg soil (See Section 7.0. The model predicts that up to 5 percent of children exposed to soil contaminated at this level may have blood lead in excess of 10 μg/dL.

7.0 ESTIMATION OF ACTION LEVELS

Blood lead levels of children who might, in the future, reside in Subarea 3b may exceed the criteria established in Section 6.1. More than 16 percent of children are predicted to have blood lead levels above 10 μg/dL. Because criteria are exceeded, this risk assessment concludes that there exists an unacceptable risk of neurological damage to children who might reside in this area in the future.

7.1 ACTION LEVELS FOR LEAD IN RESIDENTIAL SOIL

A major component of lead exposure in Subarea 3b is due to lead contamination in soil. As a consequence, reducing soil lead concentrations would be an efficient means of reducing overall lead exposure to acceptable levels. From results in the risk assessment, it is possible to estimate soil lead concentrations which would have to be achieved in order to lower predicted blood lead concentrations to acceptable levels. Such estimates are referred to as remediation goals (RGs), and are interpreted as the maximum soil concentrations which can remain on-site without increasing lead exposures above acceptable levels.

RGs are typically established by reversing the quantitative estimation of risks and exposures in the risk assessment. Instead of starting with an environmental chemical concentration and calculating an associated risk, a target risk level is chosen and an associated environmental chemical concentration is calculated. Because the IUBK model was used in the estimation of lead exposures and risks, it is the appropriate choice for generation of RGs.

To establish RGs, the IUBK model was run in default mode, except that the GSD was changed to that used in the risk assessment (1.7), and the indoor dust concentration was set at the average for occupied units (141 mg/kg). The model was then run sequentially, adjusting soil lead concentrations between runs, until the resulting blood lead distribution predicted 95 percent of the population with blood lead levels below 10 μg/dL. The resulting geometric mean blood level (4.24 μg/dL) was noted. The mean blood lead level can be considered a GSD-specific target level. Regardless of the lead source, a mean blood level of 4.24 μg/dL is always associated with a distribution with 95 percent of all children below 10 μg/dL, so long as the specified GSD is 1.7.

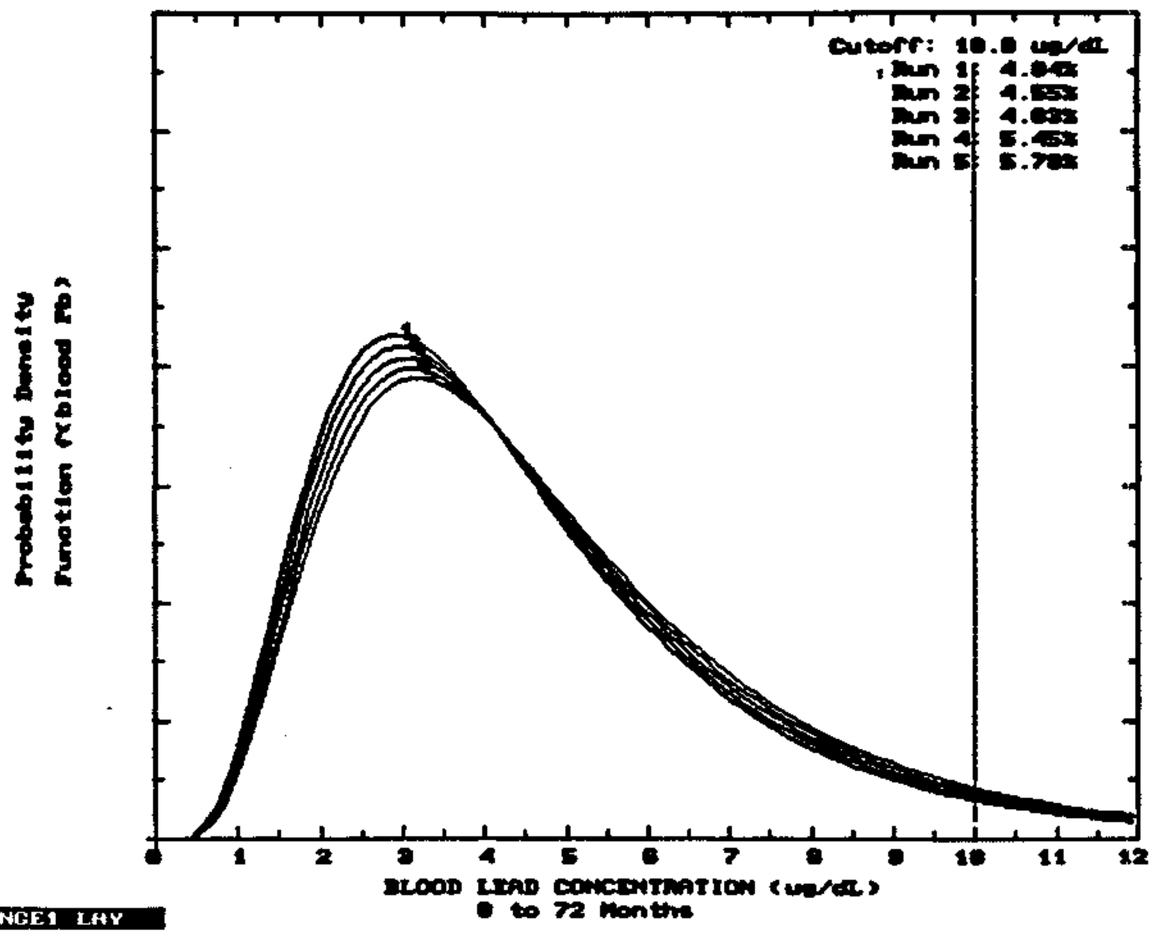
Using the model module for finding specific media concentrations associated with a given geometric mean blood level, a soil concentration was estimated for the target blood lead level. This approach is appropriate since any combination of lead exposure via different media which results in the same geometric mean blood lead level will also result in the same percentage of children with blood lead levels above any given target. Thus, the estimated soil lead level is predicted to yield exposure consistent with the definition of reasonable maximum exposure (i.e., no more than 5 percent of children with blood lead levels above 10 μg/dL). The soil action level estimated by this application of the model was 502 mg/kg. Therefore, an action level for lead in soil of approximately 500 mg/kg is recommended for the DHA site.

Representative model runs for a range of soil lead levels around the 500 mg/kg action level (450 to 550 mg/kg) are shown in Figure 7-1. At an action level of 450 mg/kg, 4 percent of children are estimated to have excessive blood lead levels; at 550, 5.8 percent The recommended action level, 500 mg/kg, falls in the middle of this range and is estimated to result in 4.8 percent of children having blood lead in excess of 10 μg/dL. To further illustrate the effect of varying soil action levels, Table 7-1 provides estimates, predicted by the model, of total intake for different age groups as soil lead increases. In general, total lead intake is predicted to increase by about 10 percent as soil lead levels increase from 450 to 550 mg/kg.

An action level of 500 mg/kg is considered a conservative estimate. It is chosen based on a prediction of that less than 5 percent of exposed children would have blood lead levels in excess of 10 μg/dL. It also incorporates several conservative assumptions, such as use of the default value for maternal blood lead levels, and site-specific information on indoor dust and tap water concentrations. Unless children receive unusual non-site related exposures, it is unlikely that an action level of 500 mg/kg will result in lead exposures exceeding the established criteria.

7.2 SENSITIVITY ANALYSIS FOR POTENTIAL "HIGH RISK" SUBPOPULATION

Concerns raised in Section 6.4.3.1 on nutritional deficiencies suggest that the sensitivity of absorption of lead in the gastrointestinal tract be evaluated. Children with inadequate diets may absorb more lead than their peers, and could be at increased risk even where soil lead concentrations are below the remediation goal suggested in the above analysis. It is important, therefore, to determine the effect of differences in gastrointestinal absorption on estimated RGs.



RANGE1 LAY

Model Parameters

Dust = 141 mg/kg
Water = 6.0 ug/L
Maternal PbB = 7.5 ug/dL
GSD = 1.7

Soil	Run 1	=	450 (μg Pb/g)
	Run 2	=	475 (μg Pb/g)
	Run 3	=	500 (μg Pb/g)
	Run 4	=	525 (μg Pb/g)
	Run 5	=	550 (μg Pb/g)

CDM *Dallas, Texas*	Dallas Housing Authority Site	Distribution of Blood Lead for a Range of Soil Action Levels	Figure No. 7-1

TABLE 7-1

MODEL RESULTS CALCULATED Pb UPTAKE					
	SOIL 450 (μg Pb/g)	SOIL 475 (μg Pb/g)	SOIL 500 (μg Pb/g)	SOIL 525 (μg Pb/g)	SOIL 550 (μg Pb/g)
AGE (Years)	Total Uptake (μg/day)	Total Uptake (μg/day)	Total Uptake (μg/day)	Total Uptake (μg/day)	Total Uptake (μg/day)
0.5-1	11.98	12.32	12.66	13.00	13.33
1-2	12.93	13.27	13.61	13.94	14.28
2-3	13.48	13.82	14.16	14.49	14.83
3-4	13.41	13.75	14.08	14.42	14.76
4-5	13.36	13.70	14.04	14.38	14.71
5-6	13.70	14.04	14.38	14.72	15.05
6-7	14.10	14.44	14.77	15.11	15.45

481\Dallas\tables\7-1.tbl
6/10/92 mm

For this analysis, gastrointestinal absorption was increased by 25 percent, and RGs estimated as described above. This value was chosen based on professional judgement, since no studies were located that could provide a quantitative estimate of absorption in children with nutritional deficiencies. Absorption inputs in the IUBK model thus increase from 50 percent to 63 percent for lead in water and diet, and from 30 percent to 38 percent for lead in soil and dust. The estimated RG decreases from 502 mg/kg using default absorption values to 291 mg/kg with the higher absorption rates. This indicates that absorption rates are sensitive determinates of predicted blood lead levels. Where absorption of lead is substantially increased, children may be at increased risk for excessive lead exposure. There is no information available on which to base nutritional status of children living in DHA housing. It is possible that this subpopulation of child is quite small.

Even considering this lower RG, however, most of the DHA property still has acceptable surface soil lead concentrations. No sample results from Area 1 (the bulk of the site) exceed 290 mg/kg, and only four of 38 samples in Area 2 exceed this criterion. In Area 3, only five of 33 samples exceed 291 but are lower than the RG of 502. Thus, only a small additional portion of the DHA property would be subject to possible remediation if the lower RG was adopted, and most of this is located in Area 3, which is currently unoccupied, and in the most westerly portions of Area 2.

This sensitivity analysis is consistent with the risk assessment, suggesting that even using "worst case" assumptions, risks associated with exposure to lead are low in the occupied areas of the site. The analysis also suggests that, during remediation, any replacement soil or capping material brought on-site should have lead levels at least as low as those in Area 1. This will provide maximum protection for children with suboptimal diets or usual lead exposures.

8.0 REFERENCES

American Conference of Governmental Industrial Hygienists (ACGIH). 1986. Documentation of the Threshold Limit Values and Biological Exposure Indices. 5th ed. Cincinnati, Ohio.

ATSDR. 1990. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Lead. June 1990.

ATSDR. 1989. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Arsenic. March 1989.

Bornshein, R. 1990. Midvale Community Blood Lead Study, Final Report. June 1990.

Camp Dresser & McKee Inc. (CDM). 1992. Dallas Housing Authority Status Report. Site Investigation at West Dallas Development, March 26, 1992.

City of Dallas. 1992. Blood lead testing of residents on DHA properties.

CDC 1985. Centers for Disease Control. Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control. DHHS Publ. No. 99-2230. U.S. Department of Health and Human Services, Atlanta, Georgia. January 1985.

Colorado Department of Health (CDH). 1989. Leadville Heavy Metals Exposure Study. Draft Report.

Drill, S., J. Knoz, J. Mahar, and M. Morse. 1979. The environmental lead problem: An assessment of lead in drinking water from a multimedia perspective. Washington, D.C.: U.S. Environmental Protection Agency. EPA 570/9-79-003. NTIS PB-296556.

Hammond, P.B. 1982. Metabolism of lead. In: J.J. Choslom, D.M. O'Hara, eds. Lead Absorption in Children: Management, Clinical and Environmental Aspects. Baltimore, Maryland: Urban and Schwarzenberg, pp. 11-20.

Henderson, L. 1991. Deputy Executive Director, Dallas Housing Authority. Personal communication with Michael Whitehead, Camp Dresser & McKee, Inc. Dallas.

Hubermont, G., J.P. Buchet, H. Roels, and R. Lauwerys. 1978. Placental transfer of lead, mercury and cadmium in women living in a rural area: importance of drinking water in lead exposure. Int. Occup. Environ. Health. 41:117-124.

Mahaffey, K.R. 1978. Environmental Exposure to Lead. In Nriagu, J.O., Ed. The Biochemistry of Lead in the Environment: Part B. Biological Effects. Elsevier/North-Holland Biomedical Press, New York.

Miekle, H.W., B. Blake, S. Burroughs, and N. Hassinger. 1984. Urban lead levels in Minneapolis: The case of the Hmong children. Environ. Rev. 34:63-76.

Ross, L. 1992. Environmental Protection Agency, Dallas. Personal communication with Michael Whitehead, Camp Dresser & McKee, Dallas.

Sager, P.R., T.W. Clarkson, and G.F. Nordberg. 1986. Reproduction and Developmental Toxicity of Metals. In Handbook of the Toxicology of Metals Vol. I, eds. L. Friberg, G.F. Nordberg, and V.B. Vouk, pp. 391-422. Amsterdam: Elsevier.

Schaum, J. 1984. Risk Analysis of TCDD Contaminated Soil. U.S. Environmental Protection Agency, Washington, D.C. Report No. EPA/600/8-84-031.

Shacklette, H. and J. Boerngen. 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper 1270.

Smith, M.A. 1981. Tentative Guidance for Acceptance Concentrations of Contaminants in Soils. Department of the Environment, United Kingdom.

Terra-Mar, Inc. 1987. Environmental Investigation Fishtrap Lake Drainage Improvements, City of Dallas, Texas. Report No. DE-7055. Terra-Mar, Inc., Dallas, TX.

Tsuchiya, K. 1986. Lead. In Handbook of the Toxicology of Metals Vol. II, Eds. L. Friberg, G.F. Nordberg, and V.B. Vouk, pp. 298-353. Amsterdam: Elsevier.

Tsuchiya, K., M. Sugita, and H. Sakurai. 1978. Dose-response relationships at different exposure levels: Re-examination in establishing no-effect levels. Sangyo Igaku. 20:247-253.

USEPA. 1991c. Drinking Water Regulations and Health Advisors by the Office of Drinking Water. April 1991.

USEPA. 1991b. Health Effects Assessment Summary Tables (HEAST). Office of Research and Development. OERR 9200.6-303. January 1991.

USEPA. 1991a. Integrated Risk Information System.

USEPA. 1990a. Users Guide for LEAD: A PC Software Application of the Uptake/Biokinetic Model, Version 4. First Draft. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Cincinnati, Ohio. September, 1990.

USEPA. 1990b. Technical Support Document on Lead. Draft. Prepared for Office of Solid Waste and Emergency Response. Prepared by Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Cincinnati, Ohio. September, 1990.

USEPA. 1990c. Air Quality Criteria for Lead: Supplement to the 1986 Addendum. Office of Research and Development, Washington, D.C., EPA/600-8-89/049F.

USEPA. 1990d. Interim baseline risk assessment for the Sharon Steel/Midvale Tailings Site, Midvale, Utah. U.S. EPA, Region VIII, Denver, CO.

USEPA. 1989a. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002.

USEPA. 1989b. Evaluation of the Potential Carcinogenicity of Lead Compounds: In Support of Reportable Quantity Adjustments Pursuant to CERCLA Section 102, External Review Draft. March 1989 EPA/600/8-89/045A. Available from NTIS, PB89-181366/AS.

USEPA. 1986a. Guidelines for carcinogenic risk assessment. Fed. Reg. 51:33992-34003.

USEPA. 1986b. Air Quality Criteria for Lead. June, 1986 and Addendum, September, 1986. Office of Research and Development, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Research Triangle Park, North Carolina. EPA/602/8-83/028A.

USEPA. 1985d. Water quality criteria; notice of final ambient water quality criteria documents. Fed. Reg. 50:30784-30796. (July 29, 1985).

USEPA. 1985c. Draft air quality criteria document for lead: Notice of a corrigendum to the second external review draft. Federal Register 50:14289-14294 (April 11, 1985).

USEPA. 1985b. National primary drinking water regulation; synthetic organic chemicals, inorganic chemicals and microorganisms; proposed rule. Fed. Reg. 50:4693-47025 (November 13, 1985).

USEPA. 1985a. Draft Health Advisory for Lead. Office of Drinking Water. Washington, D.C. September 30.

USEPA. 1984a. Air Quality Criteria for Lead. Environmental Criteria and Assessment Office. Research Triangle Park, North Carolina EPA-600/8-83-028B. September. External Review Draft.

USEPA. 1984b. Health Effects Assessment for Lead. Environmental Criteria and Assessment Office. Cincinnati, Ohio. EPA/540/1-86-055.

USEPA. 1980. Ambient Water Quality Criteria for Lead. EPA 440/5-80-057.

Von Lindern, I. 1982. Evaluation of Historical Lead Exposures to the Children of West Dallas, Texas. A Summary Report prepared for Frederick C. Baron & Associates, Dallas, Texas.

WAPORA, Inc. 1985. Environmental Analysis of Fishtrap Lake and Unnamed Adjacent Lagoon, Dallas County, Texas.

Whitehead, M. 1992. Camp Dresser & McKee, Inc., Dallas. Personal Communications with M.L. Hogg, Camp Dresser & McKee, Inc., Denver.

APPENDIX A

FISHTRAP LAKE STUDY

AN ENGINEERING AND ENVIRONMENTAL ANALYSIS

OF

FISHTRAP LAKE

prepared for

THE DALLAS HOUSING AUTHORITY
2525 Lucas Drive
Dallas, Texas 75219

prepared by

CARTER & BURGESS, INC.
8625 King George Drive; Suite 400
Dallas, Texas 75235

DECEMBER, 1985

1.0 INTRODUCTION

Fishtrap Lake is a small, 21.2-acre lake located between Kingsbridge Street and Fishtrap Road, on the southern side of the Lakewest community, a west Dallas housing project operated by the Dallas Housing Authority. Aside from an elementary school located near the northwest side of the lake, the area immediately surrounding the lake presently is undeveloped. However, other residential, commercial, and industrial areas are located within several blocks to the east, south, and west of the lake.

Due to existing volume and drainage outlet restrictions, Fishtrap Lake cannot handle inflow from a 100-year frequency strom, and thus does not meet current requirements of the City of Dallas Stormwater Management Division. Occurrance of a 100-year strom presently would result in the overtopping and flooding of adjacent local streets such as Hampton Road and Singleton Boulevard. A recent report entitled "A Plan for the Rebuilding of The West Dallas Housing Projects" prepared by Carter & Burgess, Inc., Peterson Littenburg Architects, Real Estate Research Corporation, and Selzer Associates/Selzer-Volk-Borne proposed construction of a "Town Center" along the north and west sides of the lake. Unfortunately, increased stormwater runoff from proposed Town Center improvements potentially would augment the already unacceptable flooding situation associated with Fishtrap Lake. Therefore, a feasibility study was made to determine what improvements to Fishtrap Lake would be required in order to meet the City's drainage requirements. This report summarizes the engineering and environmental findings of the feasibility study.

2.0 DESCRIPTION OF THE EXISTING FISHTRAP LAKE/LAGOON HYDRAULIC SYSTEM

Fishtrap Lake is a 21.2-acre body of water ranging in depth from less than two to greater than six feet. It acts as a storage area or detention pond for local stormwater runoff. Five storm sewer systems, ranging in size from 48 inches to 96 inches in diameter, discharge approximately 1100 cubic feet per second (cfs) of storm water into

Fishtrap Lake during a 100-year frequency storm. In order for these storm sewer facilities to function properly, the maximum lake elevation during flood conditions cannot exceed an elevation of 406.5 feet mean sea level (ft msl). This is based on a current City of Dallas requirement that storm sewer systems be designed to carry a 100-year design flow, with no water standing in the streets. Currently, when the water level in Fishtrap Lake increases above elevation 402.75 ft msl, it enters a 30-inch reinforced concrete pipe, flows through a sluice gate and thence through a 42-inch diameter discharge pipe. The discharge pipe conveys water to the nearby lagoon. The lagoon also serves as a small detention pond, storing rainwater and reducing the rate of outflow to the Trinity River. When the water elevation in the lagoon exceeds 403.02 ft msl, excess stormwater travels through four 30-inch reinforced concrete pipes under Bickers Street, and thence to a storage sump located adjacent to a pump system which pumps the water into the Trinity River. In order to provide gravity flow to the sump, water levels must reach an elevation of 402.0 ft msl on the north side of Bickers Street (based on a 1973 report by Forrest and Cotton entitled Interior Drainage Study, West Levee, Dallas Floodway Project).

In its present condition, Fishtrap Lake is inadequate to handle (hydraulically) a 100-year storm due to the limited storage capacity of the lake and outfall system. Should a 100-year design storm occur, the level of the lake would rise higher than 406.5 ft msl, causing water to back up on Hampton Road. The existing outflow structure under Bickers Street also would become a critical constriction during a 100-year design storm, and flooding of the lake and lagoon area potentially would occur.

3.0 DESCRIPTION OF HYDRAULIC ANALYSES AND RECOMMENDATIONS FOR HYDRAULIC IMPROVEMENTS

According to a report entitled "Fishtrap Road Storm Drainage Improvement Study" by Howard Needles Tammen & Bergendoff dated January, 1981 (HNTB report), the only solution to the Fishtrap area drainage problem would be to fill in the lake and construct open channels to carry flow from adjacent storm sewer outlets to the culverts under

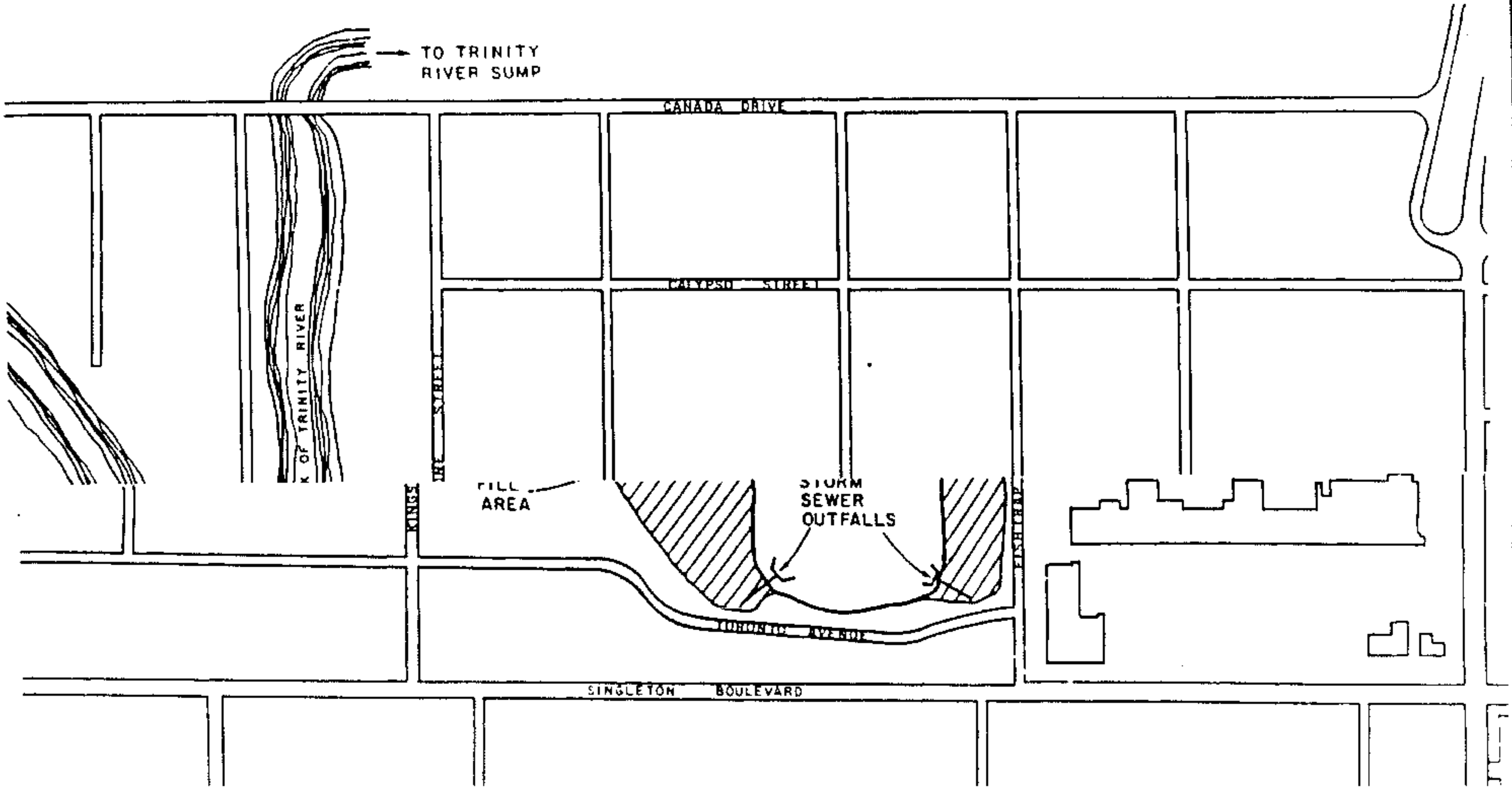
Bickers Street. The existing lake and lagoon, however, serve as a central recreational and visual amenity to the Lakewest community. In addition, the lake and lagoon serve as an important settling basin system which removes substantial amounts of lead and other pollutants that otherwise would enter the West Fork Trinity River system. However, water quality and fish in the lake remain in excellent condition (refer to the Environmental Analysis of Fishtrap Lake by WAPORA, Inc., which is attached as a technical supplement to this study). In order to retain Fishtrap Lake and the lagoon as a neighborhood amenity, substantial earthwork and construction of a large, new storm sewer system would be required. Due to the small size and linear configuration of the lagoon, it will act as a channel during a 100-year design flood. Fishtrap Lake, on the other hand, will act as a detention pond if additional excavation and fill operations are conducted to increase the effective storage area of the lake.

In order to properly evaluate the Town Center Concept Plan, an analysis of the hydraulics of Fishtrap Lake and the adjoining lagoon was performed. Computer modeling of the routing of a 100-year design flood through Fishtrap Lake and the adjacent lagoon was conducted by the City of Dallas Stormwater Management Division using the TR-20 computer program developed by the United States Department of Agriculture/Soil Conservation Service. Hydraulic design criteria used in setting up the model were obtained from the HNTB report. Topographic information prepared by Carter and Burgess, Inc. also was used to obtain lake cross-section and configuration data. In addition, an environmental assessment of water quality, sediment quality, and fish tissue was conducted to determine the effects (if any) of storm water runoff from a near-by lead smelter and other industries near Fishtrap Lake. The environmental assessment also evaluated the overall desirability and usefulness of Fishtrap Lake and the adjacent lagoon as an amenity element for the surrounding residential areas.

Since a critical section of the drainage system is located at the outfall to the West Levee Sump, the hydraulic modeling was conducted progressing upstream from the outfall. According to the modeling conducted by the City, approximately 220 linear feet (LF) of a five, 10-foot by 4-foot box culvert would be required under Bickers Street to transport storm water from a 100-year flood to the West Levee sump (Figure 1). The height of the proposed box culvert is restricted to four feet due to a 48-inch diameter sewer main presently under Bickers Street. Inflow to this culvert system will enter a proposed drop inlet in the west lagoon which will be constructed at a crest elevation of 401.0 ft. msl. Flow entering the lagoon would be conveyed by 1200 LF of a proposed five, 9-foot by 5-foot box culvert which would be constructed between Fishtrap Lake and the lagoon. The crest elevation of the proposed drop inlet structure to be built in Fishtrap Lake would be set at 402.0 ft msl. In order to create a conservative hydraulic model of the system, storage was assumed to be zero at the crest elevation. In other words, all lake depth below the crest elevation of the drop structure was considered "dead" storage, unavailable for storing or conveying a design storm (Figure 2). In order to reduce the outflow of the lake to an acceptable level, approximately 90 acre-feet of storage would be required between elevations 402.0 and 406.5 ft msl. By filling the area surrounding Fishtrap Lake to an elevation greater than 406.5 ft msl and using a slope of 3 horizontal to 1 vertical for the shoreline, this storage could be achieved. Approximately 8,000 cubic yards of fill would be required to create the desired storage, and still would result in a minimal lake expansion. The water surface of the lake currently is at 404.3 ft msl and covers 21.2 acres, according to best available aerial topographic maps. If additional fill was placed around the lake, then the water surface area of the lake during a 100-year design flow would be 21.9 acres (an increase of 0.7 acres). This would allow buildings to be built near the lake (as is proposed by the Town Center Concept Plan) without fear of flooding.

4.0 ESTIMATED COST OF PROPOSED HYDRAULIC IMPROVEMENTS

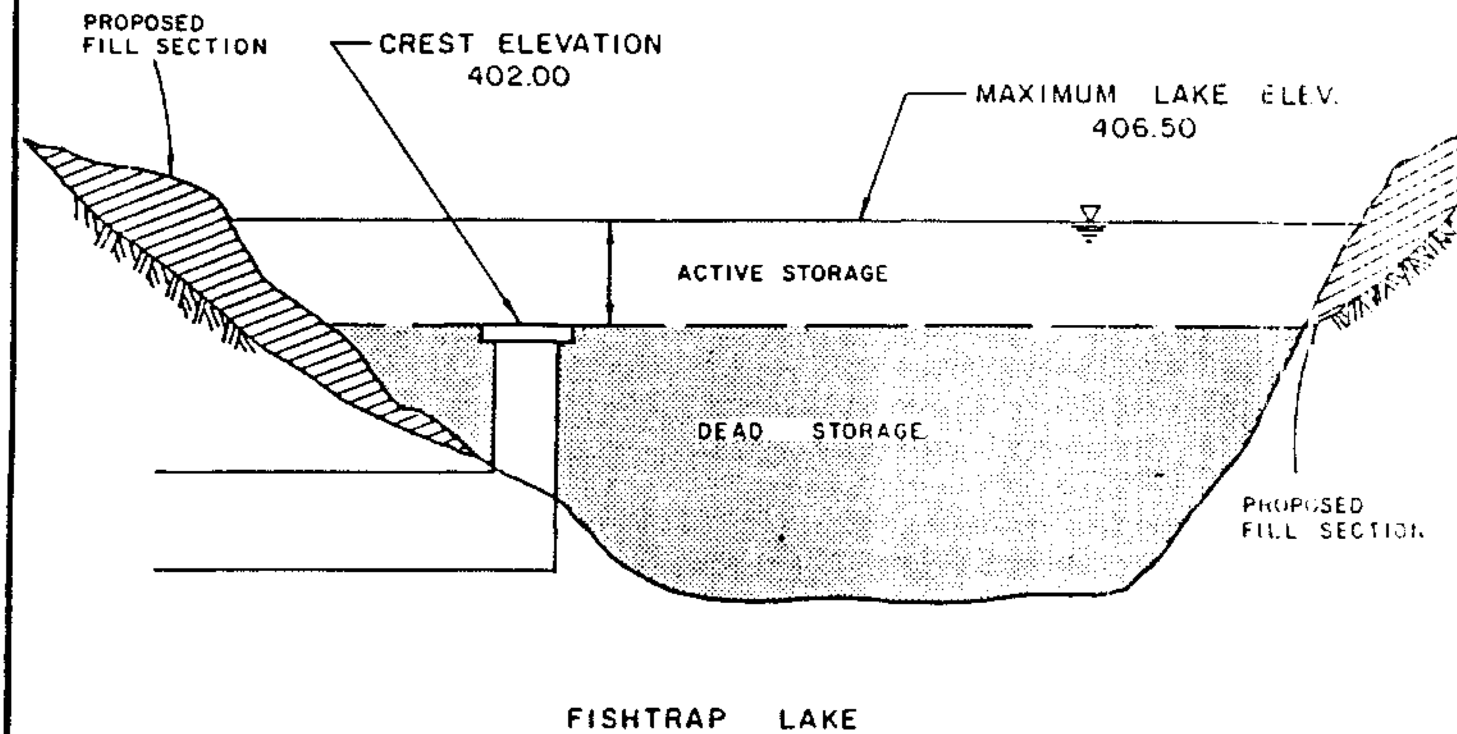
A preliminary cost estimate for the recommended box culverts and other miscellaneous drainage improvements is listed in Table 1. The total estimated construction cost for the proposed culvert system, which will allow DHA to retain the lake and lagoon as is proposed in the Town Center Concept Plan and yet meet all of the City's drainage requirements, is $2,594,454. This cost includes a 15% contingency



CARTER & BURGESS, INC.
ENGINEERS • PLANNERS
FORT WORTH • DALLAS • HOUSTON

FIGURE 1. Proposed drainage system for Fishtrap Lake and Lagoon.

DHA-Fishtrap Lake 84426-03



CARTER & BURGESS, INC.
ENGINEERS • PLANNERS

FIGURE 2. Cross section of proposed outlet structure for Fishtrap Lake.

DHA-Fishtrap Lake 84426-03

Table 1. Estimated costs for the proposed improvements to the Fishtrap Lake and Lagoon drainage system.

LOCATION West Dallas Housing DESCRIPTION Fishtrap Lake & Lagoon

DATE 4/85 ESTIMATED BY MGM OFFICE PROJECT NO 8442[illegible]-03

ITEM NO.	DESCRIPTION	QUANTITY	UNIT PRICE	SUB-TOTAL
1	(5) 10' x 4' Box Culverts	220 LF	$680 LF	$149,[illegible]
2	(5) 9' x 5' Box Culverts	1100 LF	$650 LF	$715,000
3	Lake Excavation	117,500 CY	$4.58 CY	$537,580
4	Fill Placement	8,000 CY	$1.50 CY	$ 12,000
5	Disposal of Lake Excavation*	109,500 CY	$5.00 CY	$547,500

ESTIMATED CONSTRUCTION COST $ 1,961,[illegible]

CONTINGENCIES 15[illegible] 294,[illegible]

SUB-TOTAL $ [illegible],256,[illegible]

ENGINEERING 12[illegible] 338,[illegible]

TOTAL ESTIMATED PROJECT COST $ [illegible],594,[illegible] figure and a 12% engineering and surveying fee. In addition to the box culverts required, lake excavation and excess soil removal efforts would account for a majority of the project cost. The estimated amount of soil to be excavated is based on the recommended deepening of the lake for environmental reasons (refer to attached Wapora, Inc. study) and modifications required to increase lake storage. This excavation would increase the lake depth to an average of five feet, while dropping the normal pool elevation two feet.

5.0 SUMMARY OF ENVIRONMENTAL CONSIDERATIONS

An environmental analysis of Fishtrap Lake and the adjacent lagoon was conducted by WAPORA, Incorporated. The environmental analysis evaluated water quality, sediment quality, fish tissue, and recreational potential of the Fishtrap Lake and lagoon system. WAPORA's final report is attached as Appendix A to this document.

Water quality in Fishtrap Lake and the adjacent lagoon was found to be excellent. Temperature, pH, and dissolved oxygen (DO) levels were all acceptable. A few low DO values were noted in the bottom of the lake, which indicated that an auxiliary aeration system (i.e., fountain) would be useful at a later date to enhance oxygen levels for fish life. Lead concentrations were very low, as were fecal coliform counts, which indicated a complete lack of industrial pollution or human waste (sewage) pollution in the lake or lagoon. Fish tissue analyses also indicated an absence of lead, indicating that fish caught out of Fishtrap Lake and the lagoon are perfectly acceptable for human consumption.

Sediment samples indicated that from 0 to 2.5 inches of organic and inorganic sediment is located at the bottom of the lake and lagoon. It is recommended that this sediment be removed, since decomposition of the organic material can cause drops in DO levels in the lake. The sediment was determined to contain moderate to high levels of lead, with most measurements in the 300 mg/l to 600 mg/l range. The lead levels generally were below 1000 mg/l, which is the level considered "toxic" or "dangerous" by EPA. Sediment removed from the lake and lagoon could therefore be used as fill material adjacent to the lake, but should be covered with topsoil or grass as soon as possible to avoid lead contamination of persons living in the immediate vicinity of the lake.

6.0 SUMMARY

The cost estimate for the channelization recommendation contained in the HNTB report was $2,442,400 in 1981 dollars, or approximately $2,809,000 in 1985 dollars. Construction of the HNTB alternative would have resulted in the destruction of Fishtrap Lake and the adjacent lagoon, and the associated loss of these recreational and aesthetic features for the community. Construction of the culvert systems proposed herein will cost approximately $2,594,000 (in 1985 dollars), and will result in a facility which will adequately handle a 100-year flood, and yet will retain the aesthetic and recreational benefits of Fishtrap Lake and the associated lagoon. Recent discussions with administrative officials of the City of Dallas Public Works Department, Stormwater Management Division have indicated that the City may be able to fund $1,000,000 or more of the required construction through the recently successful stormwater improvements bond program.

Additional work (i.e., design and construction efforts not included in the cost estimates presented herein) would be required to add park and recreational facilities in the lake and lagoon areas. These facilities potentially would include fountains, fishing docks, bulkheads, a landscaped island, picnic shelters, trails/sidewalks and other facilities typically found in park settings and designed in accordance with the Town Center Master Plan. Construction of the hydraulic systems recommended herein will form the basis for a hydraulically functional, cost-effective and aesthetically pleasing lake system for the Lakewest Community.

TECHNICAL

SUPPLEMENT

WAPORA, Inc. Environmental/Energy/Economic Studies

6900 WISCONSIN AVENUE, CHEVY CHASE, MARYLAND 20015
PHONE - (301) 652-9520

Project 1703 25 January 1985

ENVIRONMENTAL ANALYSIS
OF FISHTRAP LAKE AND UNNAMED ADJACENT LAGOON
DALLAS COUNTY, TEXAS

FINAL REPORT

Submitted:

Carter & Burgess, Inc.
8625 King George Drive
Suite 460
Dallas, Texas 75235

Attention: James C. Varnell, P.E.

WAPORA, Inc. Environmental/Energy/Economic Studies

6900 WISCONSIN AVENUE, CHEVY CHASE, MARYLAND 20015
PHONE - (301) 652-9520

Project 1703 — 25 January 1985

Mr. James C. Varnell, P.E.
Carter & Burgess, Inc.
8625 King George Drive
Suite 460
Dallas, Texas 75235

Dear Mr. Varnell:

Attached you will find three (3) copies of the Final Report on Fishtrap Lake - Lagoon Environmental Analysis. This report has been prepared in support of your work with the Dallas Housing Authority Project. Should you have any questions or require additional information, please feel free to contact us. We look forward to working with you again soon.

Respectfully submitted,

Roy E. Greer/cen

Roy E. Greer, M.S.
Senior Ecologist

Charles E. Newton/sw

Charles E. Newton, Ph.D.
Senior Limnologist

Approved:

D. Keith Whitenight

D. Keith Whitenight, M.F.
Regional Director

REG:CEN:ec
Enclosure

AIR — SOLID WASTE — WATER

CONTENTS

LIST OF TABLES

LIST OF FIGURES

FISHTRAP LAKE/LAGOON ENVIRONMENTAL ANALYSIS

1.0 INTRODUCTION

1.1 Purpose and Objectives

In support of a master plan refinement and implementation study being conducted by Carter & Burgess, Inc. on the West Dallas Project for the Dallas Housing Authority, WAPORA, Inc. conducted an environmental analysis of Fishtrap Lake and an unnamed lagoon adjacent to the Lake. This report presents information concerning the existing environmental condition of the two water bodies and provides suggestions and recommendations regarding potential future development in the vicinity of the lake and lagoon.

1.2 Study Area

Fishtrap Lake and the unnamed lagoon are situated in the southeastern corner of the West Dallas Housing Authority project area (Figure 1). Both water bodies are located on the same tributary of the Trinity River. The tributary flows from southeast to northwest and terminates at the Trinity River. The drainage area for Fishtrap Lake contains predominantly industrial facilities and includes sources such as the RSR lead smelter. Industrial and residential areas, as well as Fishtrap Lake, drain to the lagoon. However, a broken water main also provides substantial water to the lagoon and may keep the water level constant during dry periods.

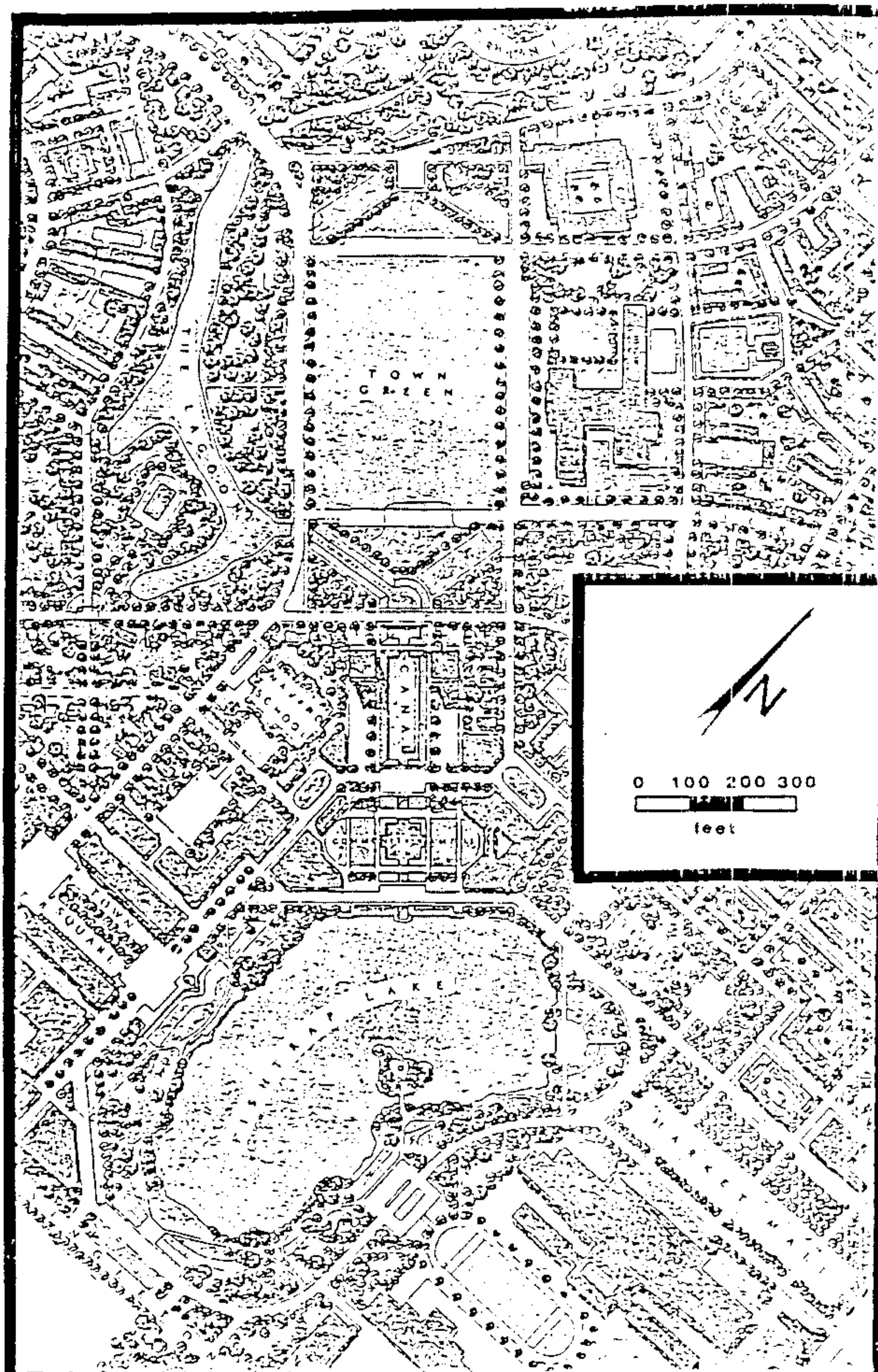


Figure 1. Project site map. Some portions of the study area are as yet undeveloped.

2.0 HABITAT DESCRIPTIONS

A field reconnaissance trip and initial sampling trip for Fishtrap Lake and the adjacent lagoon were conducted by WAPORA on 17 July and 24 July 1984, respectively, to document existing environmental conditions in the study area. Supplementary deep sediment samples were collected on 13 November 1984 to allow identification of organic sediment depths and lead concentration profiles with depth. Physical characteristics of the study area are presented in this section.

2.1 Fishtrap Lake

Fishtrap Lake covers approximately 8.5 surface acres with a maximum depth of 6 feet and an average depth of about 3.5 feet (Figure 2). Five (5) storm sewer drains are the main sources of water for the lake (Figure 2). Drain 2 probably carries the highest drainage flow, and as a result, a delta has formed extending from this outlet to the midline of Fishtrap Lake (Figure 2). The deepest water occurs along the west side of the lake, averaging about 5 feet in depth as close as 30 feet from the west shore. The east side of the lake averages less than 2 feet deep at approximately 30 feet from shore. The water was very turbid during the field reconnaissance with less than 6 inches visibility. In-lake fish habitat such as rocks, logs, brush, etc. is absent, and the bottom generally is covered with soft sediments (muck) from 1 to 2 feet deep. Approximately 10 percent of the surface area of the lake remains shaded by shoreline vegetation much of the time.

2.2 Lagoon

The lagoon is an approximately 1.2-acre serpentine body of water with a maximum water depth of 4 feet in the area where the two branches converge (Station L) and an average depth of about 2.5 feet (Figure 3). The lagoon receives runoff from Fishtrap Lake during periods of high rainfall, but in low runoff periods (generally summer through fall) most of the water entering the lagoon comes from adjacent drainage areas and the broken water main that ostensibly has remained unrepaired. The water in the lagoon was turbid, with visibility less than 6 inches during the sampling period.

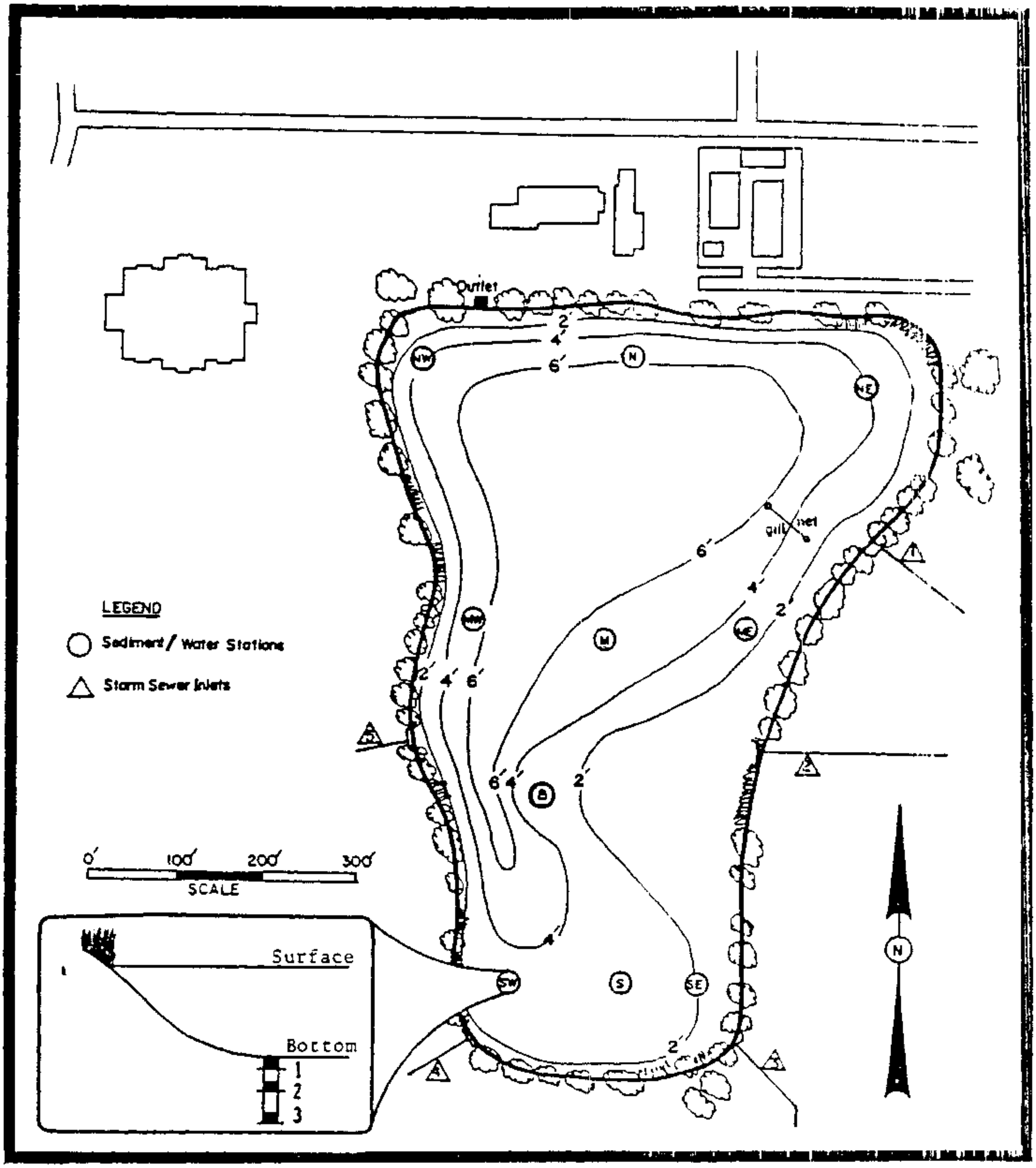


Figure 2. Depth profile, sample locations and locations of inflow and outflow structures in Fishtrap Lake. Depth contours in feet.

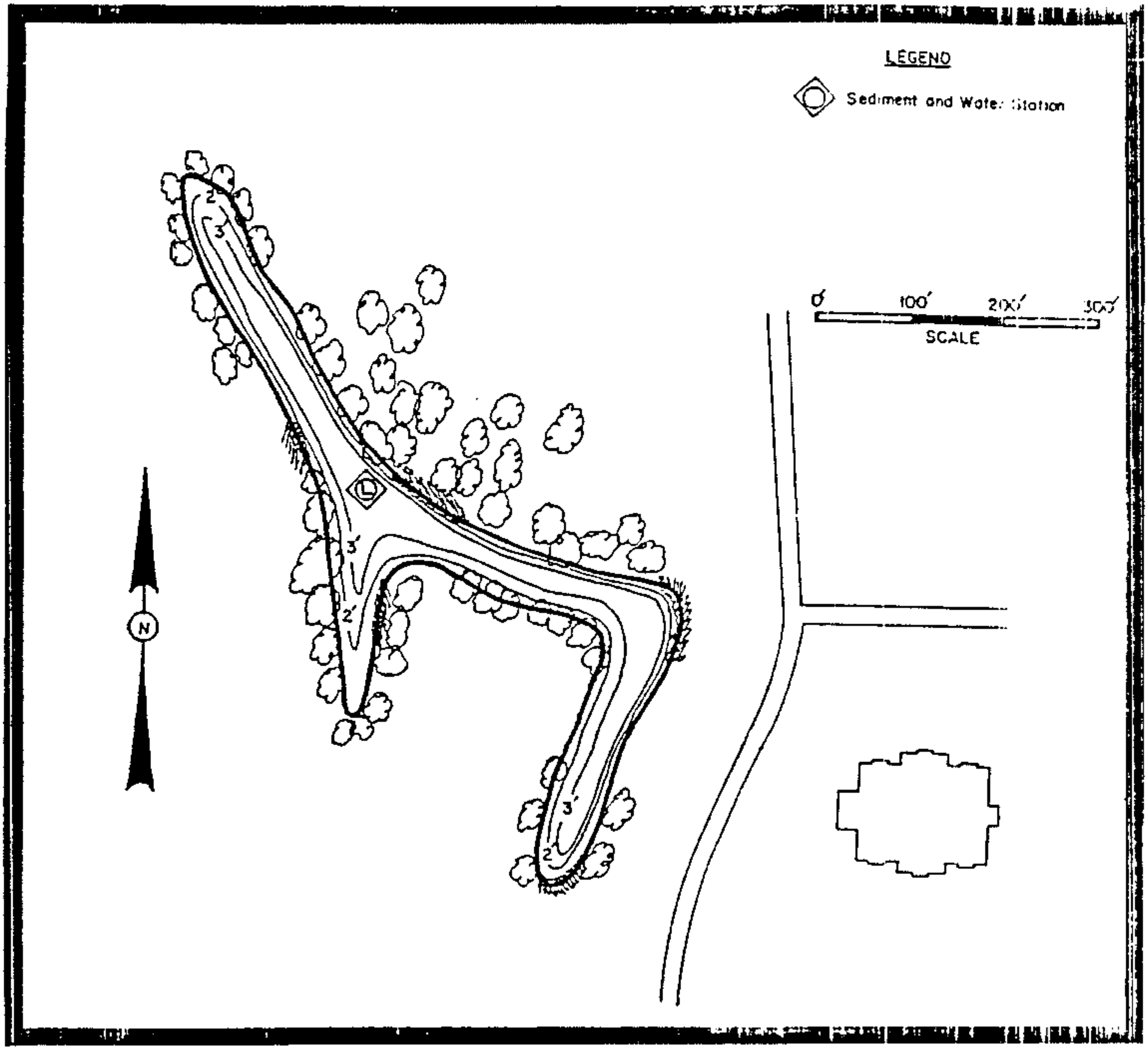


Figure 3. Depth profile and sampling location in the Lagoon. Depth contours in feet.

Natural habitat for fish in the lagoon consists primarily of numerous fallen willows (Salix spp.) in shallow areas along the shoreline. Man-made structures such as shopping carts and old tires make up the remaining fish habitat. Since the lagoon is narrow (approximately 60 to 65 feet in width), as much as 50 percent of the surface area remains shaded by shoreline vegetation during most of the day.

3.0 SAMPLING PROGRAM

3.1 Sediment Samples

During the 24 July 1984 sampling event, shallow (maximum 1 foot thick) sediment samples were collected at six (6) locations in Fishtrap Lake (Figure 2) and at one (1) location in the lagoon (Figure 3). Samples were collected with a polyvinyl chloride coring device, placed in plastic bags, and then placed on ice for transfer to the laboratory for analysis. The locations, number of samples collected, and the analyses performed on the seven (7) sediment samples are listed in Table 1.

On 13 November 1984, a sediment profile and 16 sediment samples were collected on Fishtrap Lake. The sediment samples were obtained to supplement the 0" to 6" deep sediment samples collected during July 1984. In November, sediment samples were collected from the 8" to 12" strata and the 20" to 24" strata (depth of sediment) where sufficiently deep sediments existed. Each sediment sample (16 total) was analyzed for concentrations of selected parameters. An additional sampling station (B) was incorporated into the supplementary sediment sampling.

3.2 Water Samples

Three (3) water samples were collected from Fishtrap Lake and one (1) water sample was collected from the lagoon during the 24 July sampling effort. Sampling locations in Fishtrap Lake and the lagoon are illustrated in Figures 2 and 3, respectively. In addition, in situ water measurements were made at six (6) locations in Fishtrap Lake and at one (1) location in the lagoon. Temperature, dissolved oxygen (DO), pH, and conductance were measured at each location in Fishtrap Lake, and at the one location in the lagoon.

3.3 Fish Tissue Samples

Also during the 24 July sampling effort, a 150-foot x 6-foot x 1 inch square mesh gill net was set in Fishtrap Lake at the location shown in Figure 2. The net was set in water ranging in depth from 2 to 6 feet. Muscle tissue

Table 1. List of parameters and number of samples collected and analyzed from Fishtrap Lake and the lagoon, 24 July and 13 November 1984.

	Sampling Location**											
Parameters	SW	S*	SE	MW	M*	ME	NW	N*	NE	B	GN	L*
***Lead (24 July)	2	1	2	2	1	2	2	1	2	-	-	2
(13 November)	2	2	2	2	2	1	1	2	2	1	-	-
Zinc	-	-	-	-	2	-	-	-	-	-	-	2
Nickel	-	-	-	-	2	-	-	-	-	-	-	2
Cadmium	-	-	-	-	2	-	-	-	-	-	-	2
Copper	-	-	-	-	2	-	-	-	-	-	-	2
Chromium	-	-	-	-	2	-	-	-	-	-	-	2
Mercury	-	-	-	-	2	-	-	-	-	-	-	2
Oil & Grease	-	-	-	-	1	-	-	-	-	-	-	1
PCB's	-	-	-	-	2	-	-	-	-	-	-	-
Phenols	-	-	-	-	2	-	-	-	-	-	-	-
COD	-	-	-	-	1	-	-	-	-	-	-	1
Fecal Coliforms	-	-	-	-	1	-	-	-	-	-	-	1
BOD_5	-	-	-	-	1	-	-	-	-	-	-	1
Temperature	2	-	2	2	-	2	2	-	2	-	-	1
DO	2	-	2	3	-	3	3	-	2	-	-	1
pH	1	-	1	1	-	1	1	-	1	-	-	1
Conductivity	1	-	1	1	-	1	1	-	1	-	-	1
Fish	-	-	-	-	-	-	-	-	-	-	1	-

*Water samples collected at these stations

**Sediment and in-situ data collected at all stations

***Only lead analyses performed on November samples

SW - Southwest
S - South
SE - Southeast
MW - Middle West
M - Middle
ME - Middle East
NW - Northwest
N - North
NE - Northeast
L - Lagoon
GN - Gill net set only

B - Additional Gravel Bar Sampling Station samples were collected from four (4) representative fish species. Tissue samples were placed in plastic bags and placed on ice for transfer to the laboratory for analysis of lead concentrations.

4.0 RESULTS AND DISCUSSION

4.1 Water Quality

Results of the <u>in situ</u> measurements are presented in Table 2. Water temperatures near the surface in Fishtrap Lake ranged from about 33°C (91°F) to 34°C (93°F). Water temperatures near the bottom of the lake ranged from 27.5°C (81°F) to 28.2°C (82.5°F), or approximately a 6°C (10°F) difference from lake surface to lake bottom. Likewise, DO varied from 3.3 to 9.1 mg/l near the surface to as low as 1.5 mg/l near the bottom at the deeper sampling stations. The pH values ranged from 8.4 to 8.7 in Fishtrap Lake, while the conductivity varied from 265 to 280 micro-Siemens (uS). Water temperature near the surface in the lagoon was 32°C (90°F). Near-surface DO concentration in the lagoon was 9.6 mg/l, the pH 8.8, and the conductivity was 310 uS.

Results of the laboratory-based water quality analyses are listed in Table 3. All water analysis results are presented as mg/l (i.e., parts per million, ppm). USEPA criteria for potable water and protection of aquatic life (where applicable) also are presented in Table 3. None of the samples tested exceeded these criteria, with the exception of oil and grease, and possibly phenols and PCB's where the detection limit of the analytical method was above the potable water criteria. Potable water criteria are included here only to place the measured concentrations in perspective and not to suggest the potential for potable use of Fishtrap Lake or lagoon water.

Lead concentrations within the water of Fishtrap Lake were low, at or near the detection limit for the analysis (0.001 mg/l). These concentrations are lower than median drinking water concentrations found by Durfor and Becker (1964). Harr (1975) and the National Research Council (NRC) Committee on Lead in the Human Environment (1980) found that clays and organic matter in water, sediments, and soils serve as effective coordination (adsorption) sites for dissolved lead. Consequently, the ultimate fate of lead entering Fishtrap Lake is likely to be precipitation to bottom sediments unless the pH of overlying waters were to be artificially reduced to below 6.5. The 0.009 mg/l lead concentration in lagoon water samples is not high in comparison to other

Table 2. In situ analytes measured at Fishtrap Lake and the lagoon, 24 July 1984.

SAMPLE STATION	MAXIMUM DEPTH (ft.)	TEMPERATURE (°C) Surface/Bottom	DO (mg/l) Surface/Mid/Bottom	pH Surface	CONDUCTIVITY (uS Surface
SW	4.0	34/28	8.3/6.0/-	8.7	280
SE	3.5	34/27.5	8.6/6.0/-	8.7	280
MW	5.0	33/28	9.0/5.0/3.0	8.4	275
ME	3.5	33/27.5	9.1/5.0/3.0	8.4	275
NW	6.0	33/28	8.9/3.9/1.6	8.6	265
NE	5.0	34/28	8.5/ - /2.2	8.6	26[illegible]
Lagoon	3.5	32/-	9.6/ - / -	8.8	510

No sample (-)

Table 1. Chemical analyte concentrations in water, sediment, and fish tissue samples collected from Fishtrap Lake and the lagoon, 24 July 1984.

MATRIX/STATION	Lead	Cadmium	Chromium	Copper	Mercury	Nickel	Zinc	% dry Weight	Oil & Grease	Phenol	PCB's	Fecal Coliforms (x/100 ml)	BOD	COD
Water (mg/l except coliforms):														
N	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--
M	0.001	0.0001	0.001	0.002	0.0004	0.020	0.010	--	5.7	0.005	0.01	0	78	84.0
S	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--
L	0.009	0.0001	0.001	0.001	0.0004	0.001	0.010	--	5.9	--	0.01	0	15	49.5
USEPA:														
Potable/	0.05/	0.01/	0.05/	1.0/	0.02/	--/	5.0/	--	0/	0.001/	0.00001/	200/	--/	--/
Aquatic Criteria	*	0.04	0.10	*	0.0005	*	*		*	--	--	--	--	--
Sediment (mg/kg dry):														
NW: 6"	652	--	--	--	--	--	--	32.5	--	--	--	--	--	--
12"	527	--	--	--	--	--	--	30.4	--	--	--	--	--	--
N: 12"	266	--	--	--	--	--	--	13.5	--	--	--	--	--	--
24"	257	--	--	--	--	--	--	18.1	--	--	--	--	--	--
NE: 6"	647	--	--	--	--	--	--	30.9	--	--	--	--	--	--
12"	706	--	--	--	--	--	--	19.0	--	--	--	--	--	--
24"	654	--	--	--	--	--	--	18.9	--	--	--	--	--	--
MW: 12"	621	--	--	--	--	--	--	27.8	--	--	--	--	--	--
24"	113	--	--	--	--	--	--	30.6	--	--	--	--	--	--
M: 6"	1,150	3.41	39.6	12.7	0.074	55.0	82.5	19.1	--	1.66	--	--	--	--
12"	597	--	--	--	--	--	--	17.7	--	--	--	--	--	--
18"	196	--	--	--	--	--	--	22.1	--	--	--	--	--	--
ME: 6"	12.1	--	--	--	--	--	--	73.0	--	--	--	--	--	--
12"	1,090	--	--	--	--	--	--	16.4	--	--	--	--	--	--
8: 12"	335	--	--	--	--	--	--	26.1	--	--	--	--	--	--
SW: 6"	949	--	--	--	--	--	--	31.1	--	--	--	--	--	--
12"	634	--	--	--	--	--	--	16.4	--	--	--	--	--	--
24"	740	--	--	--	--	--	--	27.2	--	--	--	--	--	--
S: 12"	332	--	--	--	--	--	--	14.8	--	--	--	--	--	--
24"	130	--	--	--	--	--	--	40.5	--	--	--	--	--	--
SE: 6"	1,490	--	--	--	--	--	--	17.6	--	--	--	--	--	--
12"	327	--	--	--	--	--	--	25.6	--	--	--	--	--	--
24"	46.0	--	--	--	--	--	--	24.8	--	--	--	--	--	--
L: 6"	614	1.81	19.1	8.98	0.054	28.3	79.6	31.0	--	--	--	--	--	--
Fish tissue (mg/kg wet)*														
Bluegill #1	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--
Bluegill #2	0.076	--	--	--	--	--	--	--	--	--	--	--	--	--
brown bullhead	0.100	--	--	--	--	--	--	--	--	--	--	--	--	--
Gizzard shad	0.097	--	--	--	--	--	--	--	--	--	--	--	--	--
Warmouth	0.070	--	--	--	--	--	--	--	--	--	--	--	--	--

-- Analysis not performed or not applicable.
* Based on 96-hr. LC50 or other site-specific criteria
** All fish from Fishtrap Lake.

aquatic systems. Lead concentrations in typical freshwater aquatic systems range between 0.0001 and 0.01 mg/l, with the maximum concentrations in the United States approaching 0.9 mg/l (NRC 1980).

Oil and grease "concentrations" observed (5.7 to 5.9 mg/l) were not unusual given the proximity of dense urban housing. Evidence of "shade tree oil changes" along the shoreline area of the lagoon was prominent.

Fecal coliform counts (#/100 ml) were zero. This suggests minimal domestic sewage input to either water body. In the absence of storm event sampling, storm water runoff dominance of inflow to Fishtrap Lake is indicated.

4.2 Sediments

Data plotted on Figure 4 illustrate the deposition thickness of sediments along the bottom of Fishtrap Lake. Sediments are from 2' to 25' deep in the southeast end of Fishtrap Lake. A rocky shelf extends out from storm drain into the lake and sediment depths are very shallow (less than 6"). Sediments are also shallow in front of the main outlet for the lake, indicating that a substantial flow exists across the lake during periods of high runoff. The northeast area also contains relatively deep sediments (2.5 feet), as does part of the mid-western section of the lake bottom.

No sediments greater than 2.5 feet in depth were sampled. In general, the average depth of sediment in the lake ranged from 1 to 2 feet. For sediment removal purposes (i.e., dredging), a depth of 1 foot of sediment per surface acre can be used to estimate the quantity of sediment necessary for removal.

Although the sediments are not as deep as first expected, it is our opinion that the sediments should be removed because at critical low volume periods the sediments represent as much as 30% of the lake volume and thus a corresponding loss of flood water retention capacity. Additionally, the organic matter in the sediments utilizes oxygen (through the decomposition

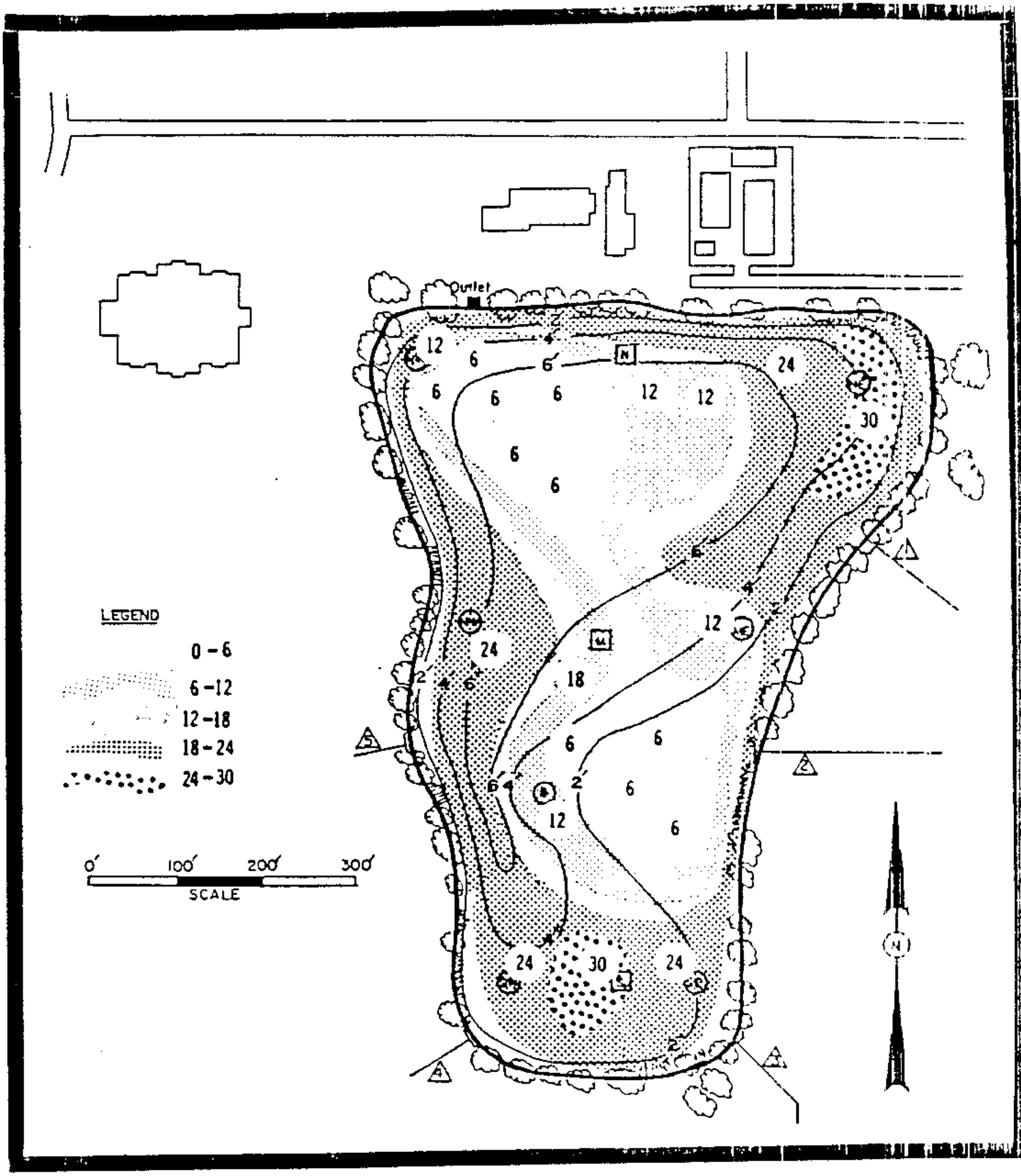


Figure 4. Sediment depths (inches) in Fishtrap Lake. Clear circles are [illegible] measurements. Shaded contours derived from interpolation by [illegible]

Observation #2 above may provide a rapid alternative analysis for lead concentrations. This could be of value in management of dredging operations, allowing "on the spot" estimation of lead removal efficiency, possibly by simple physical examination. The observed relationship is a positive correlation between organic content (typically inverse to % dry weight) and lead content.

Lead concentrations in Fishtrap Lake sediments appear to be highly influenced by the presence of nearby storm drain outlets (see Figure 2 and Table 3). The low concentration from sediments at Station ME apparently resulted from the presence of a "dome" of gravelly soil extending approximately along the 3-foot contour line, in a southwesterly direction, to about the midline of the lake.

Vertical profiles of lead concentrations in lake sediments varied considerably with sampling location. In the southern portion of the lake, a pronounced decrease in lead concentration with increasing sediment depth was noted. However, in the northern portion there was no apparent change in lead concentrations in sediment with increasing sampling depth. Multiple correlation/regression analysis yielded the following regression equation:

$$Pb = \frac{4586.0}{\%dw} + \frac{5495.1}{D_s} + \frac{344.7}{D_w} - 258.6$$

where:

Pb = lead concentration; mg/kg dry

D_s = sediment sampling depth, inches

D_w = water depth to sediments, feet

$\%\ dw$ = sediment percent dry weight

The multiple correlation coefficient for the relationship was 0.750, which is significant at the 0.99 probability level (degrees of freedom = 17). This regression can be interpreted as follows:

process), especially during the critical summer months. The removal of sediments would also reduce suspended solids and result in less turbid water, increased photosynthesis, and higher algal production for food chain organisms.

Artifical means of aeration and algal retardation may be necessary or desirable in the long-term; however, water quality conditions following sediment removal should be improved over existing conditions without any additional control measures.

Results of the sediment metal content analysis of samples collected on 24 July 1984 are also included in Table 3. High concentrations (mg/l = parts per million) of lead were observed for most samples. These concentrations support the concept of lead precipitation within the Fishtrap Lake system. Two other observations are noteworthy:

(1) There is an apparent linear correlation between all metal concentrations in lake sediments (Station M) compared to those in lagoon sediments; lake sediment concentrations of metals were invariably higher than those for lagoon sediments.

(2) A high inverse correlation ($r^2 = 0.96$; df = 4) was observed between lead concentrations in surficial (about 6") Fishtrap Lake sediments and corresponding percent dry weights. The equation representing this relationship is:

$$\text{mg Pb/kg} = \frac{30{,}849}{\%\ \text{dry wt.}} - 315.9$$

Data from the lagoon also fit this relationship.

Observation #1 above suggests measurable sediment trapping by Fishtrap Lake. Ostensibly, this "settling basin effect" will vary with the solubility and the affinity of individual metals for precipitating materials, possibly accounting for the small difference in zinc concentrations between the two water bodies.

(1) high moisture/organic content (the apparent inverse of high percent dry weight) indicates high lead content, as noted above;

(2) lead content tends to decrease with increasing depth in the sediments; and

(3) lead content tends to decrease with increasing water depth above the sediments.

The latter observation (#3) probably is related to decreasing concentrations of lead with increasing distance from the major lead source (one or all of the storm drain inlets). This is probable, since water depth generally increases from south to north and the storm drain inlets are grouped around the southeastern half of the lake (i.e., input is to the shallow portions of the lake).

The data from station ME were excluded from the above analysis as they exhibited a pronounced increase in lead concentrations from about 6" (12.1 mg/kg) to 12" (1,090 mg/kg) sediment depth. No explanation for this difference was apparent.

Aquatic macrophytes are especially efficient in removing lead from water and sediments (NRC 1980). Nutria feeding on cattails surrounding the two water bodies may represent the only concentration/magnification pathway for metals (e.g., lead) in this system (see Section 4.4). Fortunately, this should represent a hazard only to the nutria and any incidental predators on these rodents. Sediment phenol concentrations in Fishtrap Lake were less than the analytical detection limit of 1.66 mg/kg.

4.3 Fish Tissue

Four (4) species of fish were captured in a gill net set in Fishtrap Lake. The bluegill (Lepomis macrochirus) was the most frequently captured species with seven (7) individuals being taken. The black bullhead (Ictalurus melas), warmouth (Lepomis gulosus), and gizzard shad (Dorosoma cepedianum) were also captured.

Lead concentrations in fish tissues were all below analytical detection limits (see Table 3). If it is assumed that these maximum concentrations were actual tissue lead concentrations, a worst-case perspective can be derived. The highest "concentration" (0.1 mg/kg) is lower than all fish market canned fish reported by Ewing et al. (1979) where a range of 0.28 to 0.72 mg/kg was determined. Fish taken from Fishtrap Lake would not, therefore, pose a hazard to humans or other fish consumers.

4.4 Terrestrial Habitat

The shoreline surrounding Fishtrap Lake is composed predominantly of mature (10 to 20 year old) black willow (*Salix nigra*) and an occasional bald cypress (*Taxodium distichum*) (Figure 2). Willows encircle approximately 85 percent of the periphery of the lake. Broadleaf cattail (*Typha latifolia*) grows immediately inside or adjacent to the willows and occupies about 25 percent of the perimeter of the lake. Willow and cattail are native to North Texas and are the most frequent species observed around permanent water. The bald cypress around the lake were planted. A maintained lawn containing a mixture of grasses and weeds extends to the water's edge over the remaining 15 percent of the lake shoreline. This vegetation cover is maintained by periodic mowing except in the immediate shore zone.

Shoreline vegetation surrounding the lagoon is predominantly (90 percent coverage) black willow and broadleaf cattail. Maintained lawn encompasses the remaining 10 percent of the lagoon shoreline (Figure 3).

Cattails growing in the water have been eaten by nutria (*Myocastor coypus*). The nutria is a large (15 to 20 pounds) aquatic rodent that is generally uncommon in the Dallas area. Several nutria were observed feeding on cattails at the water's edge during the site reconnaissance and sampling trips.

Additionally, several species of waterbirds, the belted kingfisher (*Ceryle alcyon*), yellow-crowned night-heron (*Nycticorax violaceus*), great blue heron (*Ardea herodias*), and green heron (*Butorides striatus*) were observed feeding in the shallows or resting in willows around Fishtrap Lake and the lagoon. Sufficient habitat is present around both water bodies to attract a diverse assemblage of waterbirds. The proximity of the two water bodies to the Trinity River increases the chance for use by waterbirds.

5.0 DEVELOPMENT RECOMMENDATIONS

5.1 Current Recreational Use

Both water bodies are used by area residents for leisure walks, watching wildlife, and for fishing. A number of individuals and several groups of various ages were observed using these water bodies during the site reconnaissance and sampling trips. Concrete walkways exist around the north and east sides of Fishtrap Lake. No structured fishing areas such as piers or bulkheads are now available, so people fish from the shore. Several picnic tables have been erected at the northwest edge of Fishtrap Lake. No developed facilities currently are available around the lagoon.

Tall weeds (2-3 feet in height) occur around the periphery (5-10 feet from shore) of most of both water bodies. Since the weeds may attract snakes and pest organisms, and also present a physical barrier, only limited areas around the water bodies are commonly accessible from the shore.

5.2 Recommendations

Both water bodies and adjacent grounds provide recreational benefit as well as visual benefit to area residents. A variety of measures could be undertaken to improve existing conditions. Piers and/or bulkheads could be built to extend into Fishtrap Lake and/or the lagoon to provide users an unobstructed firm platform from which to fish, relax, or watch animal life. Additional structures, such as tire reefs, could be placed near bulkheads to provide better fishing by concentrating what fish are available. A maintenance program also should be initiated to cut weeds and pick up debris to provide additional and safer shoreline access and thus reduce over-utilization and subsequent shoreline erosion of the few areas presently available. For example, secure (possibly in-ground) trash receptacles may be in order. More picnic areas also could be constructed. A bike and jogging trail around Fishtrap Lake likewise would add appeal and increase the overall recreational use of the area.

6.0 LITERATURE CITED

Durfor, C.N. and E. Becker. 1964. Public water supplies of the 100 largest cities in the United States, 1962. U.S. Geological Survey Water Supply Paper 1812. U.S. Government Printing Office. Washington, D.C.

Ewing, R.A., M.A. Bell, and G.A. Lutz. 1979. The health and environmental impacts of lead. An assessment of the need for limitations. Office of Toxic Substances. EPA-560/2-79-001. Environmental Protection Agency. Washington, D.C.

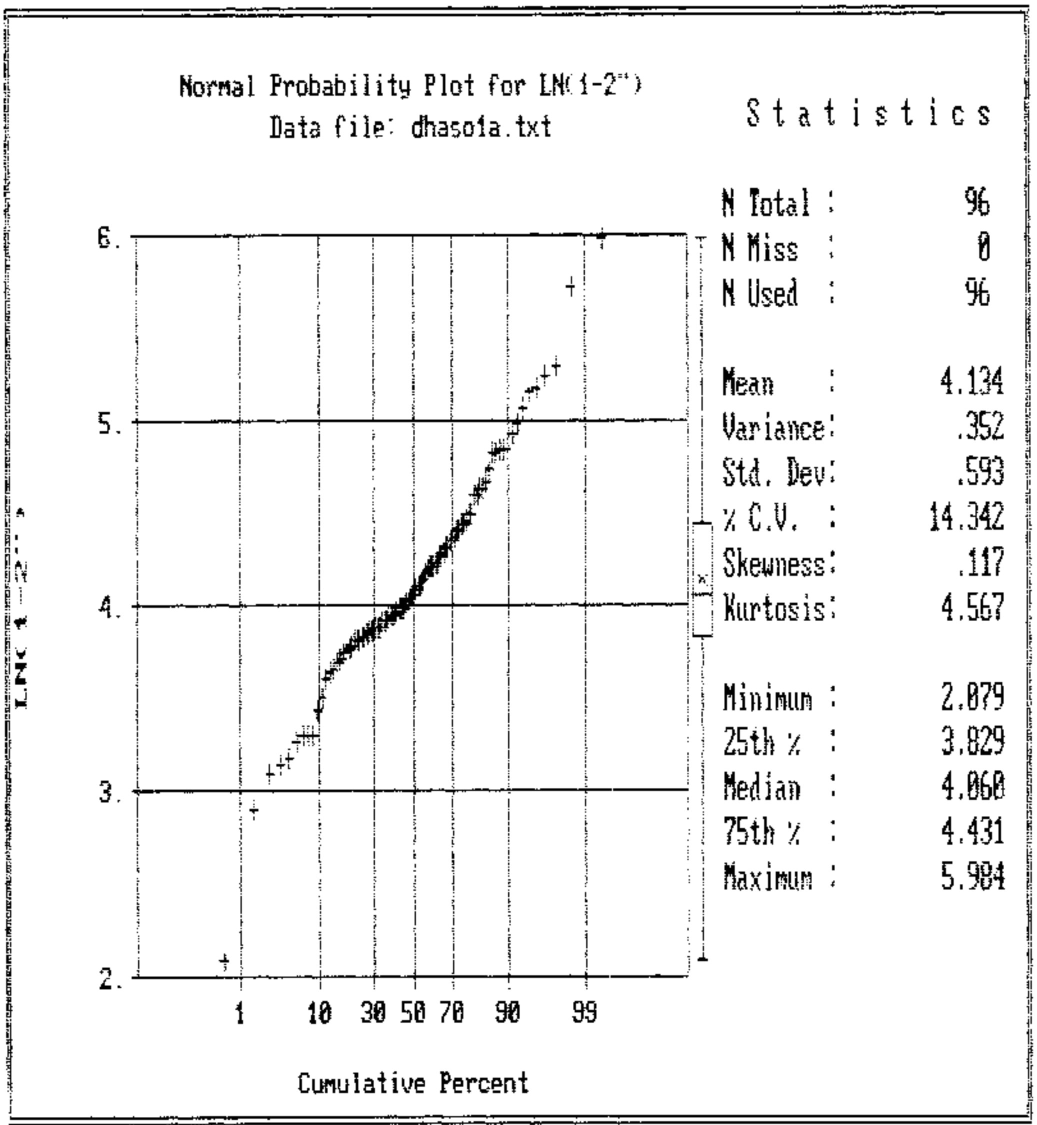
Haar, G.T. 1975. Lead in the environment. Origins, pathways, and sinks. In: Environmental Quality and Safety, Volume II. F. Coulston and F. Korte Eds. Academic Press, New York - San Francisco.

National Research Council Committee (NRCC). 1980. Lead in the human environment. National Academy of Sciences, Washington, D.C.

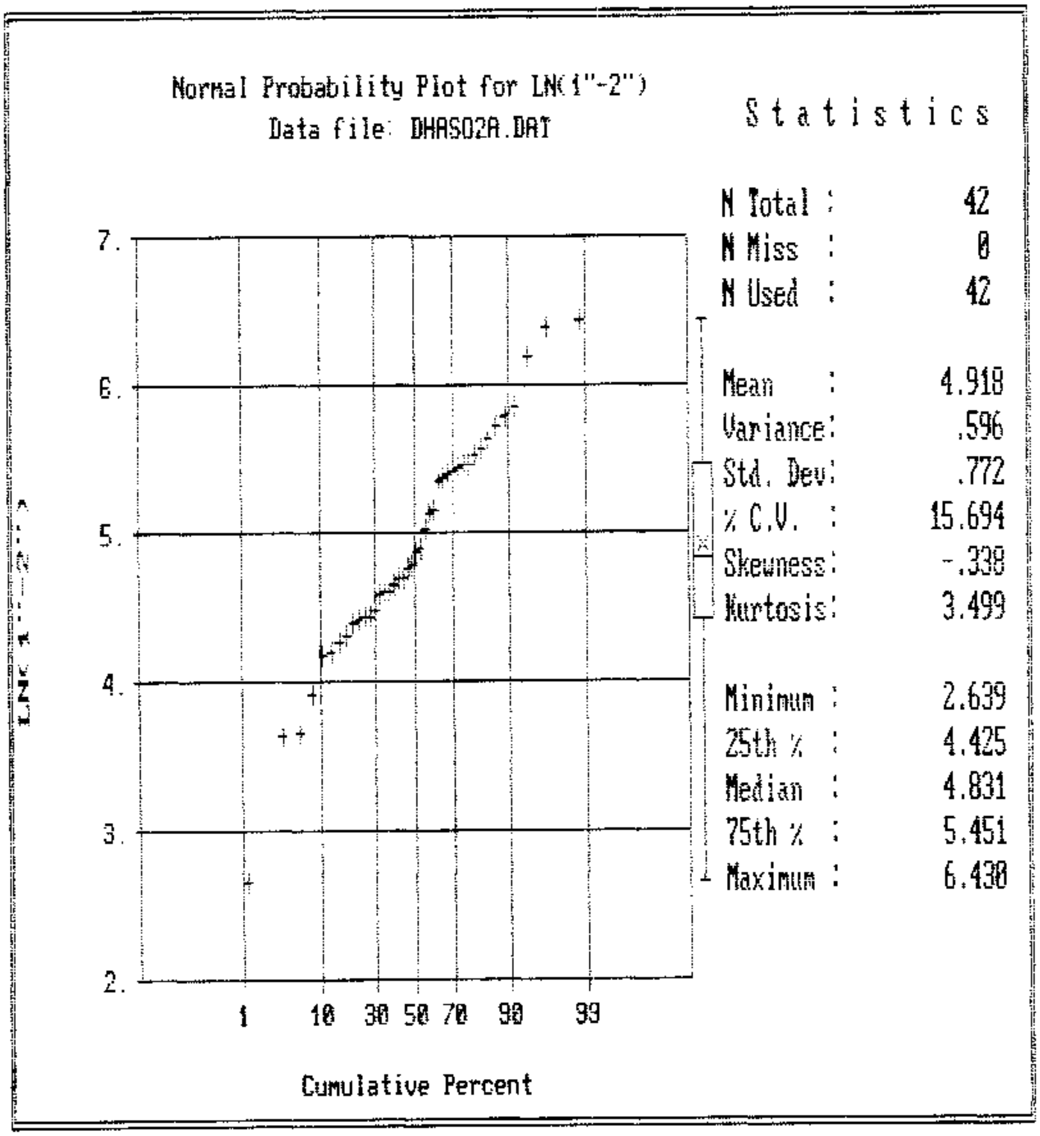
U.S. Environmental Protection Agency. 1976. Quality criteria for water. Office of Water and Hazardous Materials. USEPA, Report No. EPA-440/9-76-023. Washington, D.C.

APPENDIX B

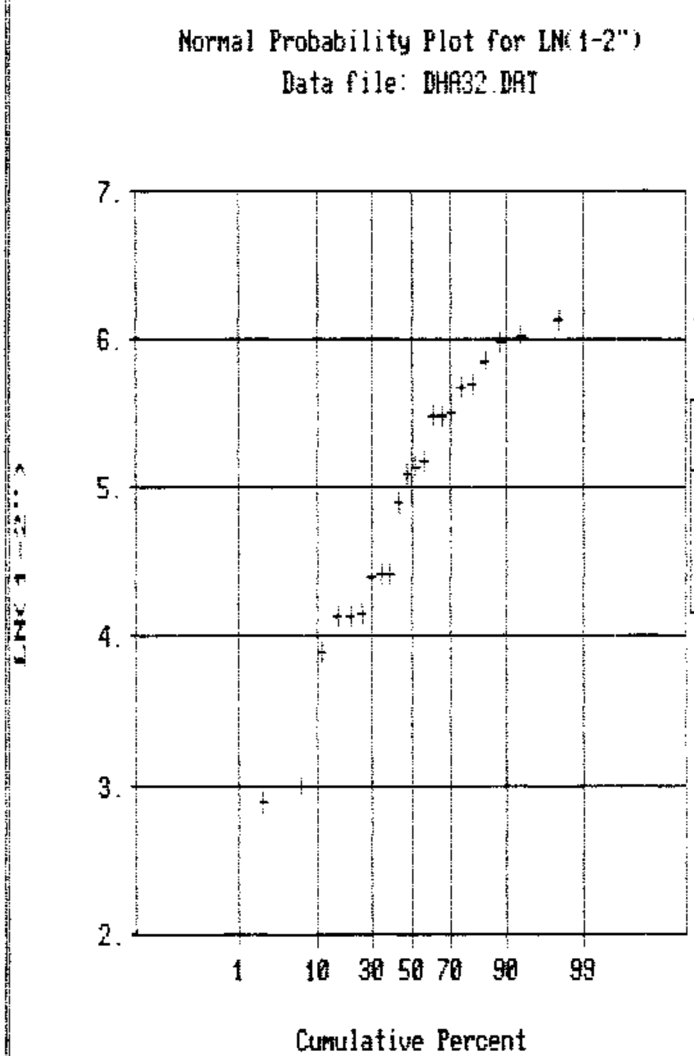
COMPARATIVE CONCENTRATIONS OF LEAD AT 1 TO 2 AND 2 TO 6 INCHES



CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Probability Plot for Area 1 1 - 2"**	Appendix B



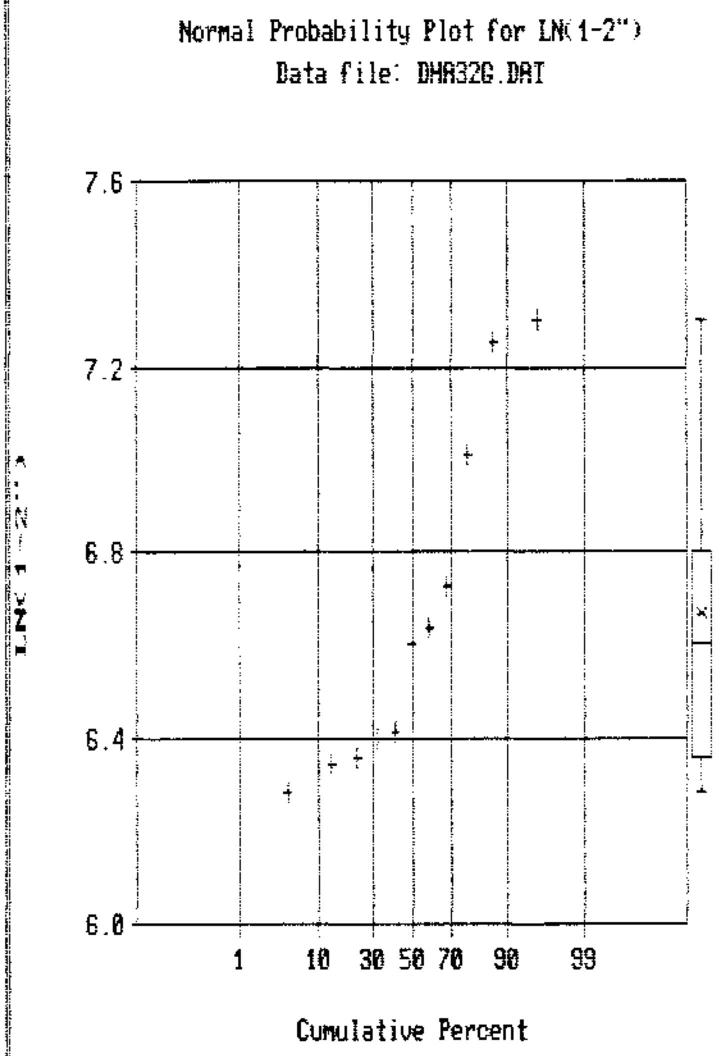
CDM *Dallas, Texas*	Dallas Housing Authority Site	Soil Probability Plot for Area 2 1 - 2"	Appendix B



Statistics

N Total :	22
N Miss :	0
N Used :	22
Mean :	4.888
Variance:	.872
Std. Dev:	.934
% C.V. :	19.102
Skewness:	-.603
Kurtosis:	2.507
Minimum :	2.890
25th % :	4.151
Median :	5.103
75th % :	5.590
Maximum :	6.125

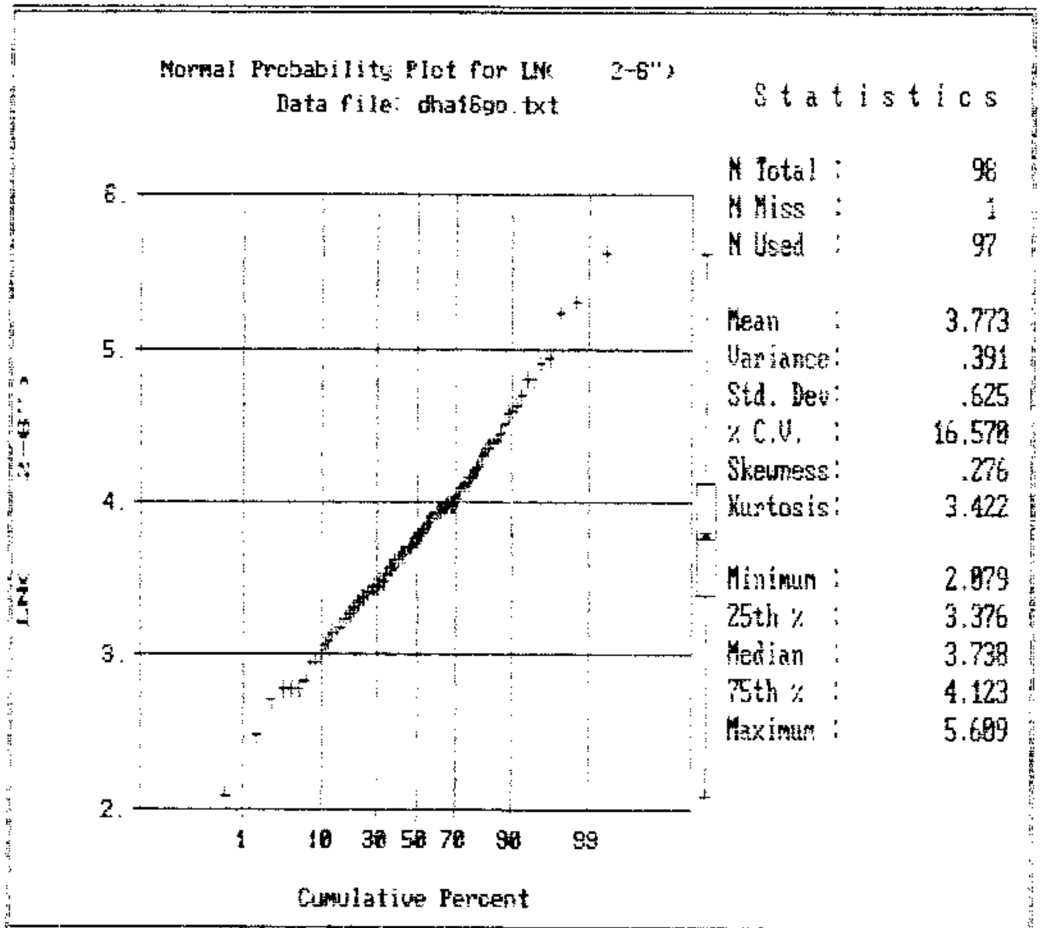
CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Probability Plot for Area 3A 1 - 2"**	Appendix B



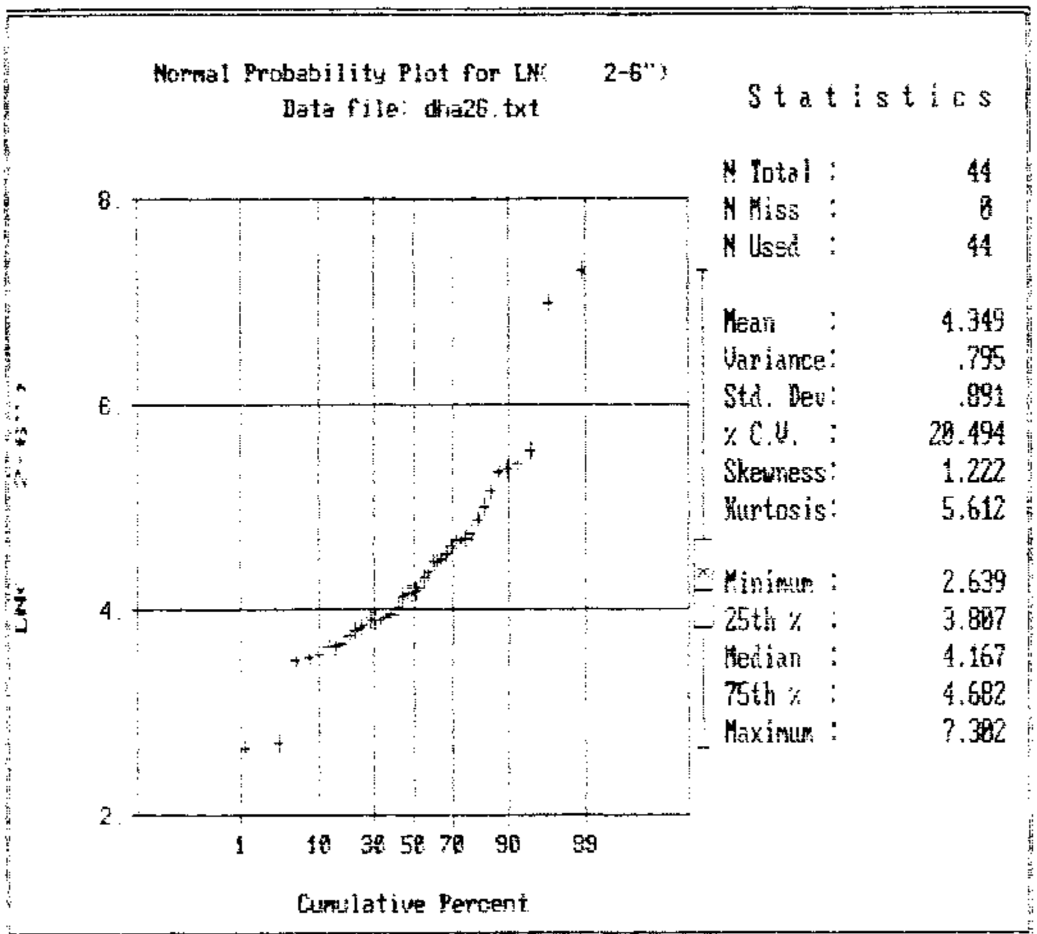
Statistics

N Total :	11
N Miss :	0
N Used :	11
Mean :	6.666
Variance:	.135
Std. Dev:	.367
% C.V. :	5.509
Skewness:	.723
Kurtosis:	2.070
Minimum :	6.282
25th % :	6.357
Median :	6.600
75th % :	6.799
Maximum :	7.300

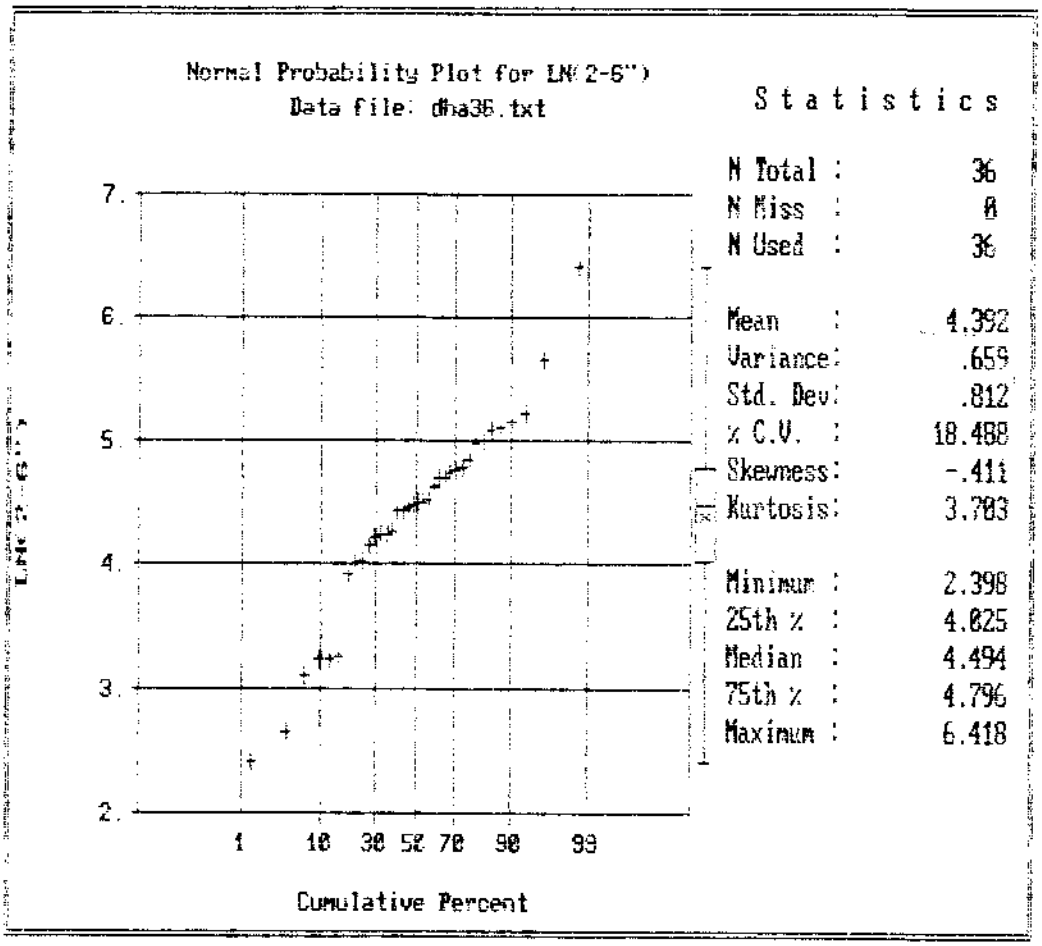
CDM Dallas, Texas	Dallas Housing Authority Site	Soil Probability Plot for Area 3B 1 - 2"	Appendix B



CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Probability Plot for Area 1 2 - 6"**	Appendix B



CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Probability Plot for Area 2** **2 - 6"**	Appendix B



CDM *Dallas, Texas*	**Dallas Housing Authority Site**	**Soil Probability Plot for Area 3 2 - 6"**	Appendix B

APPENDIX C

DUST LEAD MEASUREMENTS AND REGRESSION ANALYSIS

DALLAS HOUSING AUTHORITY
INDOOR DUST SAMPLES

REGRESSION OF LEAD CONCENTRATION VS Pb/FILTER
SECOND SAMPLING ROUND

SAMPLE ID	UG/FILTER	MG/KG	REGRESSION
ID-29	0.1	0.1	
ID-28	0.1	0.1	
ID-20	2.1	92	126.04235569159
ID-22	3.4	75	126.90202407322
ID-21	89.3	34	183.70625238223
ID-33	101	104	191.44326601687
ID-35	442	632	416.94084288964
ID-32	525	547	471.82734987041
ID-30	1342	1322	1012.0957378618
ID-27	1440	635	1076.9014930921
ID-23	1545	1362	1146.3362308388
ID-31	3539	2432	2484.9349648104
ID-25	3675	2517	2554.8694822728
ID-26	5952	1561	4060.6113665524
ID-24	6600	2192	4489.1228908324

Regression Output:

Constant		124.6537
Std Err of Y Est		219.8955
R Squared		0.947909
No. of Observations		11
Degrees of Freedom		9
X Coefficient(s)	0.661263	
Std Err of Coef.	0.051673	

CALCULATED LEAD CONCENTRATIONS
FIRST SAMPLING ROUND

ID-01	1854	124.6537
ID-02	19.8	124.6537
ID-03	15.9	124.6537
ID-04	10.2	124.6537
ID-05	0.1	124.6537
ID-06	5.2	124.6537
ID-07	24.6	124.6537
ID-08	45.2	124.6537
ID-09	5.3	124.6537
ID-10	21.9	124.6537
ID-11	34.3	124.6537
ID-12	10	124.6537
ID-13	17.9	124.6537
ID-15	21.2	124.6537
ID-16	8.4	124.6537
ID-17	96.3	124.6537
ID-18	42.8	124.6537

ID-17	96.3	188	N	1748.423
ID-35	442	417	N	
ID-32	525	472	N	
ID-30	1342	1012	N	
ID-27	1440	1077	N	
ID-23	1545	1146	N	
ID-01	1854	1351	N	
ID-31	3539	2465	N	
ID-25	3875	2555	N	
ID-26	5952	4061	N	
ID-24	6600	4489	N	
ID-05	0.1	125	Y	
ID-20	2.1	126	Y	
ID-22	3.4	127	Y	
ID-06	5.2	128	Y	
ID-09	5.3	128	Y	
ID-16	8.4	129	Y	
ID-12	10	131	Y	
ID-04	10.2	131	Y	
ID-03	15.9	135	Y	
ID-13	17.9	136	Y	
ID-02	19.8	138	Y	
ID-15	21.2	139	Y	
ID-10	21.9	139	Y	
ID-07	24.6	141	Y	
ID-11	34.3	147	Y	
ID-18	42.8	153	Y	
ID-08	45.2	155	Y	
ID-21	89.3	184	Y	
ID-33	101	191	Y	
		141.2414		

APPENDIX D

AIR MONITORING DATA

STATION 131049

3345 Fish Trap Road
AMBIENT AIR QUALITY SURVEILLANCE

SAMPLE DATE	FILTER NUMBER	LEAD ug/cum	PARTICULATES ug/cum	REMARKS
03-Jan-79	782208	0.8	41	0
09-Jan-79	782264	0.7	44	0
15-Jan-79	790018	0.8	64	0
21-Jan-79	790120	1.7	43	0
27-Jan-79	790107	0.3	20	0
02-Feb-79	790108	1.8	59	0
08-Feb-79	790111	0.5	48	0
14-Feb-79	790126	0.2	62	0
20-Feb-79	790137	2.5	68	0
26-Feb-79	790158	2.2	102	0
04-Mar-79	790154	0.8	31	0
10-Mar-79	790152	0.9	48	0
16-Mar-79	790162	0.6	42	0
22-Mar-79	790165	*	59	1
28-Mar-79	790169	0.2	68	0
03-Apr-79	790180	0.7	50	0
09-Apr-79	790187	0.4	47	0
15-Apr-79	790166	1.1	63	0
21-Apr-79	790606	0.8	51	0
27-Apr-79	790618	2.3	73	0
03-May-79	790639	*	0	6
09-May-79	790632	0.2	71	0
15-May-79	790623	1.1	97	0
21-May-79	790657	0.5	51	0
27-May-79	790640	0.3	60	0
02-Jun-79	790679	0.5	42	0
08-Jun-79	790663	0.4	61	0
14-Jun-79	790675	0.3	92	0
20-Jun-79	790695	0.2	51	0
26-Jun-79	790727	0.6	57	0
02-Jul-79	790688	0.1	63	0
08-Jul-79	790809	0.3	79	0
14-Jul-79	790810	0.2	54	0
20-Jul-79	790826	1.2	143	0
26-Jul-79	790835	0.2	36	0
01-Aug-79	000000	1.3	66	0
01-Aug-79	790899	*	66	0
07-Aug-79	000000	1	84	0
07-Aug-79	790854	*	84	0
13-Aug-79	000000	0.6	71	0
13-Aug-79	790842	*	71	0
19-Aug-79	000000	0.2	62	0
19-Aug-79	790882	*	82	0
25-Aug-79	000000	1.2	82	0
25-Aug-79	790885	*	82	0
31-Aug-79	000000	0.7	81	0
31-Aug-79	791005	*	81	0
06-Sep-79	000000	1.6	80	0
06-Sep-79	791018	*	80	0
12-Sep-79	000000	0.9	104	0
12-Sep-79	791020	*	104	0
18-Sep-79	000000	0.7	87	0
18-Sep-79	791035	*	87	0
24-Sep-79	000000	1	65	0
24-Sep-79	791026	*	65	0
30-Sep-79	000000	1.6	90	0
30-Sep-79	791042	*	90	0
06-Oct-79	000000	1.4	101	0
06-Oct-79	791046	*	101	0
12-Oct-79	000000	1	126	0
12-Oct-79	791053	*	126	0
18-Oct-79	000000	0.3	77	0
18-Oct-79	790873	*	77	0
24-Oct-79	000000	1.1	57	0
24-Oct-79	790864	*	57	0
30-Oct-79	000000	0.4	44	0
30-Oct-79	791204	*	44	0
05-Nov-79	000000	0.8	68	0
05-Nov-79	791211	*	68	0
11-Nov-79	791218	*	0	9
17-Nov-79	000000	0.9	66	0
17-Nov-79	791070	*	66	0
23-Nov-79	000000	0.7	31	0
23-Nov-79	791456	*	31	0
29-Nov-79	000000	0.4	56	0
29-Nov-79	791077	*	56	0
05-Dec-79	000000	0.7	103	0
05-Dec-79	791230	*	103	0
11-Dec-79	000000	0.2	73	0
11-Dec-79	791240	*	73	0
17-Dec-79	000000	0.6	56	0
17-Dec-79	791225	*	56	0
23-Dec-79	000000	0.4	33	0
23-Dec-79	791263	*	31	0
29-Dec-79	000000	0.2	29	0
29-Dec-79	791586	*	29	0

04-Jan-80	791225	0.4	56	0
10-Jan-80	791279	0.3	48	0
16-Jan-80	791637	0.9	51	0
22-Jan-80	791613	0.2	17	0
28-Jan-80	791659	0.4	34	0
03-Feb-80	791658	0.7	45	0
09-Feb-80	791623	0.1	43	0
15-Feb-80	791629	0.3	41	0
21-Feb-80	791669	*	569	1
27-Feb-80	791657	1.7	159	0
04-Mar-80	791654	*	118	1
10-Mar-80	791680	*	203	1
16-Mar-80	800119	0.1	32	0
22-Mar-80	791695	*	0	9
28-Mar-80	800112	0.5	54	0
03-Apr-80	800120	0.1	54	0
09-Apr-80	800133	1.2	98	0
15-Apr-80	800138	1.1	88	0
21-Apr-80	800142	0.8	87	0
27-Apr-80	800147	0.5	72	0
03-May-80	800151	*	0	13
09-May-80	791687	*	0	15
15-May-80	800156	0.2	25	0
21-May-80	800196	0.2	47	0
27-May-80	000000	*	0	15
02-Jun-80	800167	*	0	4
08-Jun-80	800176	*	0	4
14-Jun-80	800192	0.1	74	0
20-Jun-80	800191	0.1	58	0
26-Jun-80	800188	0.3	71	0
02-Jul-80	800658	0.2	77	0
08-Jul-80	000000	*	0	12
14-Jul-80	800656	*	0	15
20-Jul-80	000000	*	0	12
26-Jul-80	800633	*	0	15
01-Aug-80	800617	0.1	76	0
07-Aug-80	800626	0.1	49	0
13-Aug-80	801126	0.4	58	0
19-Aug-80	801128	0.1	69	0
25-Aug-80	801134	0.5	65	0
31-Aug-80	801024	0.1	50	0
06-Sep-80	801029	0.4	51	0
12-Sep-80	800686	0.4	81	0
18-Sep-80	800655	0.8	105	0
24-Sep-80	800652	0.4	92	0
30-Sep-80	801161	1.1	39	0
06-Oct-80	801179	0.8	55	0
12-Oct-80	801159	1.8	75	0
18-Oct-80	801171	3.8	78	0
24-Oct-80	801142	2.1	48	0
30-Oct-80	801621	2.2	89	0
05-Nov-80	801628	3.2	120	0
11-Nov-80	801183	0.7	84	0
17-Nov-80	801639	0.2	24	0
23-Nov-80	801198	0.2	23	0
30-Nov-80	801192	1.5	84	0
05-Dec-80	801741	0.3	42	0
11-Dec-80	801753	2.5	88	0
17-Dec-80	801603	1.4	62	0
23-Dec-80	801522	0.4	74	0
29-Dec-80	801604	0.4	69	0
04-Jan-81	801416	0.3	56	0
10-Jan-81	801410	0.8	59	0
16-Jan-81	801739	0.4	50	0
22-Jan-81	801721	0.9	59	0
28-Jan-81	801725	1.5	120	0
03-Feb-81	801729	0.7	67	0
09-Feb-81	801784	0.4	48	0
15-Feb-81	801791	0.5	69	0
21-Feb-81	801803	0.3	80	0
27-Feb-81	801805	0.3	60	0
05-Mar-81	801812	0.5	49	0
11-Mar-81	801819	0.8	79	0
17-Mar-81	801767	*	214	1
23-Mar-81	801771	0.7	100	0
29-Mar-81	801778	*	*	4
04-Apr-81	801830	*	151	0
10-Apr-81	801833	*	78	0
16-Apr-81	801841	0.3	78	0
22-Apr-81	810051	*	390	9
28-Apr-81	801852	0.3	80	0
04-May-81	801873	0.3	44	0
10-May-81	801868	0.2	48	0
16-May-81	801884	0.3	32	0
22-May-81	801891	0.3	67	0
28-May-81	810506	0.2	67	0
03-Jun-81	810511	0.4	30	0
09-Jun-81	810539	0.1	59	0
15-Jun-81	810521	0.1	44	0
21-Jun-81	810524	0.1	63	0
27-Jun-81	810593	0.4	57	0
03-Jul-81	810567	0.3	41	0
09-Jul-81	810588	0.3	55	0
15-Jul-81	810559	0.1	64	0
21-Jul-81	810548	0.3	81	0

27-Jul-81	810577	0.3	61	0
02-Aug-81	810580	0.2	61	0
08-Aug-81	810566	0.6	61	0
14-Aug-81	810816	0.5	61	0
20-Aug-81	810804	0.5	82	0
26-Aug-81	810976	0.5	45	0
01-Sep-81	000000	0.5	42	0
07-Sep-81	000000	0.2	60	0
13-Sep-81	000000	0.3	79	0
19-Sep-81	000000	1	74	0
25-Sep-81	000000	0.3	90	0
01-Oct-81	811013	0.3	105	0
07-Oct-81	811005	0.3	23	0
13-Oct-81	811076	0.3	26	0
19-Oct-81	811063	0.9	55	0
25-Oct-81	810902	0.1	37	0
31-Oct-81	810905	0.2	41	0
06-Nov-81	810486	1.3	82	0
12-Nov-81	811080	1.4	111	0
18-Nov-81	811069	0.4	92	0
24-Nov-81	811090	0.9	80	0
30-Nov-81	811112	0.5	72	0
06-Dec-81	811103	0.2	49	0
12-Dec-81	811384	0.3	82	0
18-Dec-81	811189	0.7	62	0
24-Dec-81	811170	1.4	49	0
30-Dec-81	811140	0.3	61	0
05-Jan-82	811143	0.1	45	0
11-Jan-82	811182	0.2	51	0
17-Jan-82	811186	0.2	54	0
23-Jan-82	811138	0.4	54	0
29-Jan-82	611137	0.1	60	0
04-Feb-82	611120	0.2	56	0
10-Feb-82	620144	0.3	59	0
16-Feb-82	620159	0.2	46	0
22-Feb-82	620025	0.6	86	0
28-Feb-82	820119	1.1	82	0
06-Mar-82	620117	0.3	50	0
12-Mar-82	620180	*	0	14
18-Mar-82	620196	*	0	14
24-Mar-82	620116	*	0	9
30-Mar-82	620138	0.5	79	0
05-Apr-82	620272	*	0	1
11-Apr-82	620132	0.4	35	0
17-Apr-82	620412	0.1	51	0
23-Apr-82	620177	0.6	61	0
29-Apr-82	620160	0.4	62	0
05-May-82	620174	0.2	62	0
11-May-82	620167	*	0	14
17-May-82	620172	0.2	37	0
23-May-82	620338	0.3	57	0
29-May-82	620365	0.1	79	0
04-Jun-82	620320	0.2	55	0
10-Jun-82	620332	0.2	98	0
16-Jun-82	620313	0.2	54	0
22-Jun-82	520310	0.3	60	0
28-Jun-82	620306	0.2	72	0
04-Jul-82	620306	0.1	50	0
10-Jul-82	620351	0.2	59	0
16-Jul-82	620350	0.4	56	0
22-Jul-82	620347	0.5	112	0
28-Jul-82	620375	0.4	87	0
03-Aug-82	620373	0.3	77	0
09-Aug-82	620363	0.4	75	0
15-Aug-82	620368	0.3	59	0
21-Aug-82	620360	*	59	12
27-Aug-82	620385	0.3	76	0
02-Sep-82	620616	0.3	79	0
08-Sep-82	620613	0.4	95	0
14-Sep-82	000000	*	*	12
20-Sep-82	000000	*	*	12
26-Sep-82	000000	*	*	12
02-Oct-82	000000	*	0	8
08-Oct-82	620606	0.2	62	0
14-Oct-82	620686	0.9	81	0
20-Oct-82	620625	0.2	55	0
26-Oct-82	620626	0.5	83	0
01-Nov-82	620636	0.2	45	0
07-Nov-82	620635	0.1	41	00
13-Nov-82	620676	0.2	36	0
19-Nov-82	620662	0.2	48	0
25-Nov-82	620665	0.2	40	5
01-Dec-82	620668	0.1	42	0
07-Dec-82	620670	0.8	69	0
13-Dec-82	620682	0.2	55	0
19-Dec-82	620683	0.2	60	0
25-Dec-82	620694	0.1	49	0
31-Dec-82	621261	0.4	42	0
06-Jan-83	620690	0.5	73	0
12-Jan-83	621136	0.3	46	0
18-Jan-83	621121	0.3	52	0
24-Jan-83	621135	0.5	63	0
30-Jan-83	621130	0.4	37	0
05-Feb-83	621127	0.2	30	0

11-Feb-83	821123	0.9	56	0
17-Feb-83	821164	1.4	66	0
23-Feb-83	821177	0.6	66	0
01-Mar-83	821173	0.4	71	0
07-Mar-83	821174	0.4	54	0
13-Mar-83	821196	0.1	55	0
19-Mar-83	821188	0.4	63	0
25-Mar-83	821188	0.3	52	0
31-Mar-83	821189	*	*	6
06-Apr-83	830157	*	29	0
12-Apr-83	830156	0.2	64	0
18-Apr-83	830154	0.3	71	0
24-Apr-83	830147	0.4	64	0
30-Apr-83	830397	0.1	66	0
06-May-83	830390	0.2	65	0
12-May-83	830679	0.2	72	0
18-May-83	830671	0.5	65	0
24-May-83	830670	0.5	65	0
30-May-83	830160	*	*	5
05-Jun-83	830171	0.3	52	0
11-Jun-83	830518	*	*	5
17-Jun-83	830509	*	*	8
23-Jun-83	830539	0.3	110	0
29-Jun-83	830525	0.2	72	0
05-Jul-83	830677	0.2	59	0
11-Jul-83	830684	0.3	73	0
17-Jul-83	830563	0.1	68	0
23-Jul-83	830571	*	*	8
29-Jul-83	830962	0.2	75	0
04-Aug-83	830963	0.2	48	0
10-Aug-83	830971	0.2	67	0
15-Aug-83	831074	0.2	84	0
22-Aug-83	831070	0.2	57	0
28-Aug-83	831195	0.2	83	0
03-Sep-83	831164	0.8	119	0
09-Sep-83	831184	0.2	46	0
15-Sep-83	831273	0.2	95	0
21-Sep-83	831263	0.4	51	0
27-Sep-83	831377	0.6	94	0
03-Oct-83	831365	0.2	98	0
09-Oct-83	831437	0.8	112	0
15-Oct-83	831430	0.2	82	0
21-Oct-83	831481	0.1	17	0
27-Oct-83	831486	0.9	103	0
02-Nov-83	831615	0.2	53	0
08-Nov-83	831602	0.3	58	0
14-Nov-83	831680	0.3	69	0
20-Nov-83	831670	0.2	33	0
26-Nov-83	831779	0.1	30	0
02-Dec-83	831775	0.6	48	0
08-Dec-83	831767	0.6	77	0
14-Dec-83	831842	0.4	61	0
20-Dec-83	831850	0.3	83	0
26-Dec-83	831901	*	*	15
01-Jan-84	831917	0.4	63	0
07-Jan-84	831906	1.2	126	0
13-Jan-84	840003	0.2	71	0
19-Jan-84	840011	0.2	86	0
25-Jan-84	840077	0.9	134	0
31-Jan-84	840068	1.1	108	0
06-Feb-84	840118	0.4	82	0
12-Feb-84	840262	0.5	57	0
18-Feb-84	840146	*	*	5
24-Feb-84	840378	0.4	57	0
01-Mar-84	840318	0.2	61	0
07-Mar-84	840310	0.2	64	0
13-Mar-84	840455	*	*	15
19-Mar-84	840491	0.1	80	0
25-Mar-84	840580	0.3	50	0
31-Mar-84	840596	*	*	16
06-Apr-84	840639	0.3	79	0
12-Apr-84	840636	0.2	94	0
18-Apr-84	840766	0.3	127	0
24-Apr-84	840777	*	*	13
30-Apr-84	840888	*	*	18
06-May-84	840899	0.1	110	0
12-May-84	840969	0.2	60	0
18-May-84	840962	0.3	79	0
24-May-84	000000	*	*	15
30-May-84	841104	*	*	12
05-Jun-84	841171	0.2	44	0
11-Jun-84	841223	0.2	61	0
17-Jun-84	841296	0.1	37	0
23-Jun-84	841282	0.1	63	0
29-Jun-84	841287	0.2	74	0
05-Jul-84	841517	0.2	52	0
11-Jul-84	841506	0.2	93	0
17-Jul-84	841538	0.2	113	0
23-Jul-84	841528	0.3	120	0
29-Jul-84	841642	0.1	64	0
04-Aug-84	841652	0.2	84	0
10-Aug-84	841706	0.3	90	0
16-Aug-84	841754	0.3	91	0
22-Aug-84	841847	0.1	71	0
28-Aug-84	841938	0.2	97	0

03-Sep-84	841930	0.1	50	0
09-Sep-84	842019	0	48	0
15-Sep-84	842007	0.2	99	0
21-Sep-84	842013	0.3	129	0
27-Sep-84	842197	0.2	63	0
03-Oct-84	842133	*	*	10
09-Oct-84	842262	0.6	106	0
15-Oct-84	842279	*	*	5
21-Oct-84	842275	0.1	35	0
27-Oct-84	842385	0.2	36	0
02-Nov-84	842393	0.2	63	0
08-Nov-84	842511	0.1	79	0
14-Nov-84	842507	0.2	89	0
20-Nov-84	842560	0.3	64	0
26-Nov-84	842677	0.5	57	0
02-Dec-84	842596	0.1	82	0
08-Dec-84	842798	0.4	60	0
14-Dec-84	842662	0.3	32	0
20-Dec-84	842593	0.3	39	0
26-Dec-84	842940	0.2	29	0
01-Jan-85	842940	0.1	28	0
07-Jan-85	842964	*	*	18
13-Jan-85	850001	0.1	42	0
19-Jan-85	850010	0.4	121	0
25-Jan-85	850112	*	*	5
31-Jan-85	850138	0.1	41	0
06-Feb-85	850222	0.3	93	0
12-Feb-85	850286	0.5	97	0
18-Feb-85	850290	0.2	74	0
24-Feb-85	850361	0.2	36	0
02-Mar-85	850398	0.1	86	0
08-Mar-85	850474	0.2	92	0
14-Mar-85	850388	0.2	46	0
20-Mar-85	850481	0.1	37	0
26-Mar-85	850409	0.2	112	0
01-Apr-85	850402	0.1	63	0
07-Apr-85	850718	0.1	66	0
13-Apr-85	850759	0.2	49	0
19-Apr-85	850645	0.1	89	0
25-Apr-85	850902	0.3	82	0
01-May-85	850833	0.2	61	0
07-May-85	850990	0.3	104	0
13-May-85	850966	0.1	73	0
19-May-85	850972	0.2	53	0
25-May-85	851087	0	88	0
31-May-85	851141	0.1	121	0
06-Jun-85	851222	*	49	0
12-Jun-85	851242	*	72	0
18-Jun-85	851265	*	68	0
24-Jun-85	851284	*	71	0
30-Jun-85	851420	*	95	0
06-Jul-85	851451	0.3	*	0
12-Jul-85	851586	0.2	*	0
18-Jul-85	851596	0	*	0
24-Jul-85	851642	0.1	*	0
30-Jul-85	851688	0.1	*	0
05-Aug-85	851762	0.1	73	0
11-Aug-85	851653	0.1	81	0
17-Aug-85	851723	0.1	84	0
23-Aug-85	851908	0.1	71	0
29-Aug-85	851983	0.2	143	0
04-Sep-85	852037	0.1	122	0
10-Sep-85	851749	0.1	57	0
16-Sep-85	852128	0.2	72	0
22-Sep-85	852134	0.1	83	0
28-Sep-85	852185	0.1	53	0
04-Oct-85	851448	0.1	124	0
10-Oct-85	852276	0.1	45	0
16-Oct-85	852401	0.2	83	0
22-Oct-85	852418	*	*	10
28-Oct-85	852578	0.1	84	0
03-Nov-85	852594	0.2	60	0
09-Nov-85	852625	0.1	72	0
15-Nov-85	852721	0.1	18	0
21-Nov-85	852776	0.1	41	0
27-Nov-85	852771	0.1	21	0
03-Dec-85	852857	*	48	0
09-Dec-85	852815	*	57	0
15-Dec-85	852981	*	37	0
21-Dec-85	853025	*	75	0
27-Dec-85	853102	*	71	0
02-Jan-86	860005	*	74	0
08-Jan-86	860038	*	55	0
14-Jan-86	860081	*	137	0
20-Jan-86	860179	*	114	0
26-Jan-86	860217	*	51	0
01-Feb-86	860205	0	54	0
07-Feb-86	853142	0.1	38	0
13-Feb-86	860261	*	*	8
19-Feb-86	860384	*	*	8
25-Feb-86	860505	*	*	5
03-Mar-86	860461	0.1	78	0
09-Mar-86	860580	*	*	6
15-Mar-86	860700	*	*	3

21-Mar-86	860741	*	*	3
27-Mar-86	860799	*	*	3
02-Apr-86	860818	0.1	93	0
08-Apr-86	860837	0	98	0
14-Apr-86	860900	0.1	97	0
20-Apr-86	860913	0.1	30	0
26-Apr-86	860965	*	*	10
02-May-86	861086	0.1	46	0
08-May-86	861092	0	65	0
14-May-86	861186	0.1	65	0
20-May-86	861241	0.1	69	0
26-May-86	861248	0	46	0
01-Jun-86	861340	0.1	28	0
07-Jun-86	861355	0.1	48	0
13-Jun-86	861387	0.1	66	0
19-Jun-86	861399	0.3	63	0
25-Jun-86	861550	0.2	96	0
01-Jul-86	861667	0.1	100	0
07-Jul-86	861614	0.1	116	0
13-Jul-86	861601	0.1	80	0
19-Jul-86	861818	0.1	82	0
25-Jul-86	861846	0.1	76	0
31-Jul-86	862018	0.2	93	0
06-Aug-86	862012	0.1	61	0
12-Aug-86	862075	0.1	57	0
18-Aug-86	862082	*	*	8
24-Aug-86	000000	*	*	8
30-Aug-86	862130	0.1	70	0
05-Sep-86	862306	0.1	43	0
11-Sep-86	862381	*	*	15
17-Sep-86	862418	0.1	71	0
23-Sep-86	862103	0.1	62	0
29-Sep-86	862518	0.1	65	0
05-Oct-86	862547	0	24	0
11-Oct-86	862570	0.1	33	0
17-Oct-86	862676	0.2	91	0
23-Oct-86	862746	0.1	22	0
29-Oct-86	862812	0.2	102	0
04-Nov-86	862831	0.1	30	0
10-Nov-86	862869	0.2	34	0
16-Nov-86	862893	0.1	36	0
22-Nov-86	862964	0.2	48	0
28-Nov-86	863046	0.2	49	0
04-Dec-86	863068	0.2	61	0
10-Dec-86	863172	0	34	0
16-Dec-86	863262	0.1	75	0
22-Dec-86	863316	0	39	0
28-Dec-86	863350	0.1	65	0
03-Jan-87	863387	0	30	0
09-Jan-87	863408	0	31	0
15-Jan-87	863514	*	*	18
21-Jan-87	863521	0.1	66	0
27-Jan-87	863548	0.2	92	0
02-Feb-87	870010	0.1	92	0
08-Feb-87	870053	0	38	0
14-Feb-87	870030	0	63	0
20-Feb-87	870101	0	37	0
26-Feb-87	870167	0.1	20	0
04-Mar-87	870201	0.2	104	0
10-Mar-87	870204	0.1	52	0
16-Mar-87	870311	0.1	52	0
22-Mar-87	870347	0.1	64	0
28-Mar-87	870358	0	43	0
03-Apr-87	870434	0.2	64	0
09-Apr-87	870496	0.2	71	0
15-Apr-87	870519	0.2	70	0
21-Apr-87	870631	0.1	53	0
27-Apr-87	870239	0.2	107	0
03-May-87	870683	0.2	63	0
09-May-87	870695	0.1	76	0
15-May-87	870804	0.1	63	0
21-May-87	870815	0.2	68	0
27-May-87	870870	0.1	79	0
02-Jun-87	870900	0	55	0
08-Jun-87	870914	*	*	19
14-Jun-87	870962	*	*	8
20-Jun-87	870969	0	42	0
26-Jun-87	871030	0.1	65	0
02-Jul-87	871081	0.3	74	0
08-Jul-87	871105	0	44	0
14-Jul-87	871139	0.1	43	0
20-Jul-87	871207	0.1	67	0
26-Jul-87	871213	0	58	0
01-Aug-87	871223	0	55	0
07-Aug-87	871237	0.1	95	0
13-Aug-87	871250	0	116	0
19-Aug-87	871349	0	118	0
25-Aug-87	871384	0.1	79	0
31-Aug-87	871428	0.1	46	0
06-Sep-87	871490	0	67	0
12-Sep-87	871524	0	47	0
18-Sep-87	871549	0	31	0
24-Sep-87	871561	0	75	0
30-Sep-87	871573	0.1	75	0
06-Oct-87	871627	0	102	0

12-Oct-87	871661	0.1	90	0
18-Oct-87	871656	0.1	70	0
24-Oct-87	871707	0	33	0
30-Oct-87	871783	0	63	0
05-Nov-87	871796	0.1	63	0
11-Nov-87	871336	0.2	71	0
17-Nov-87	871832	0.1	45	0
23-Nov-87	871866	0.1	47	0
29-Nov-87	871910	0.1	43	0
05-Dec-87	871925	*	50	0
11-Dec-87	871937	*	*	19
17-Dec-87	872019	*	56	0
23-Dec-87	872061	*	28	0
29-Dec-87	871972	*	39	0
04-Jan-88	872099	0.1	56	0
10-Jan-88	880021	0.1	83	20
16-Jan-88	880064	0	49	0
22-Jan-88	880078	0.1	85	0
28-Jan-88	880115	*	*	19
03-Feb-88	880166	0	41	0
09-Feb-88	871991	0.1	69	0
15-Feb-88	880244	0.1	55	0
21-Feb-88	880257	*	*	19
27-Feb-88	880358	*	*	8
04-Mar-88	880306	0.1	56	0
10-Mar-88	880316	0.2	83	0
16-Mar-88	880154	0	56	0
22-Mar-88	880331	0	57	0
28-Mar-88	880424	0	66	0
03-Apr-88	880460	0	57	0
09-Apr-88	880473	0	101	0
15-Apr-88	880549	0	62	0
21-Apr-88	880558	0	59	0
27-Apr-88	880567	0	53	0
03-May-88	880686	0.1	66	0
09-May-88	880701	0.1	123	0
15-May-88	880652	0.1	46	0
21-May-88	880729	0.1	32	0
27-May-88	880729	*	*	8
02-Jun-88	880781	*	*	8
08-Jun-88	000000	*	*	8
14-Jun-88	000000	*	*	17
20-Jun-88	000000	*	*	17
26-Jun-88	000000	*	*	17

STATION 131049Q

3345 Fish Trap Road

AMBIENT AIR QUALITY SURVEILLANCE

SAMPLE DATE	FILTER NUMBER	LEAD ug/cum	PARTICULATE ug/cum	REMARKS
21-Apr-80	800227	*	0	5
27-Apr-80	800289	*	0	4
03-May-80	800339	*	0	4
14-Jul-80	800958	*	*	12
20-Jul-80	000000	*	*	12
26-Jul-80	801006	*	*	12
01-Aug-80	800799	*	96	0
07-Aug-80	800627	*	63	0
13-Aug-80	801068	*	62	0
19-Aug-80	801071	*	75	0
25-Aug-80	801075	*	88	0
31-Aug-80	801023	*	34	0
06-Sep-80	801028	*	36	0
12-Sep-80	801017	*	74	0
18-Sep-80	800642	*	98	0
24-Sep-80	801098	*	87	0
30-Sep-80	801402	*	37	0
06-Oct-80	801097	*	58	0
12-Oct-80	801436	*	74	0
18-Oct-80	801170	*	68	0
24-Oct-80	801152	*	47	0
30-Oct-80	801620	*	99	0
05-Nov-80	801466	*	119	0
11-Nov-80	801471	*	85	0
17-Nov-80	801471	*	18	0
23-Nov-80	801457	*	23	0
30-Nov-80	801188	*	71	0
05-Dec-80	801453	*	39	0
11-Dec-80	801489	*	85	0
17-Dec-80	000000	*	*	9
23-Dec-80	801493	*	65	0
29-Dec-80	801615	*	67	0
04-Jan-81	801606	*	46	0
10-Jan-81	801609	*	53	0
16-Jan-81	801528	*	52	0
22-Jan-81	801540	*	60	0
28-Jan-81	801557	*	109	0
03-Feb-81	801551	*	62	0
09-Feb-81	801531	*	45	0
15-Feb-81	801568	*	51	0
21-Feb-81	801579	*	69	0
27-Feb-81	801582	*	51	0
05-Mar-81	801589	*	44	0
11-Mar-81	801596	*	60	0
17-Mar-81	810003	*	198	1
23-Mar-81	810024	*	71	0
29-Mar-81	810030	*	*	4
04-Apr-81	810010	*	134	0
10-Apr-81	801834	*	64	0
16-Apr-81	810041	*	67	0
22-Apr-81	810050	*	57	0
28-Apr-81	801851	*	67	0
04-May-81	801872	*	46	0
10-May-81	801866	*	41	0
16-May-81	810089	*	33	0
22-May-81	801880	*	77	0
28-May-81	810083	*	65	0
03-Jun-81	810088	*	26	0
09-Jun-81	810682	*	64	0
15-Jun-81	810697	*	40	0
21-Jun-81	810693	*	55	0
27-Jun-81	810665	*	62	0
03-Jul-81	810586	*	39	0
09-Jul-81	810757	*	51	0
15-Jul-81	810743	*	74	0
21-Jul-81	810746	*	117	4
27-Jul-81	810714	*	57	0
02-Aug-81	810701	*	58	0
08-Aug-81	810708	*	59	0
14-Aug-81	811032	*	50	0
20-Aug-81	811031	*	78	0
26-Aug-81	810778	*	70	0
01-Sep-81	811059	*	39	0
07-Sep-81	810777	*	54	0
13-Sep-81	810766	*	74	0
19-Sep-81	810769	*	69	0
25-Sep-81	811054	*	79	0
01-Oct-81	811014	*	80	0
07-Oct-81	811002	*	16	0
13-Oct-81	810937	*	26	0
19-Oct-81	811062	*	55	0
25-Oct-81	810481	*	36	0
31-Oct-81	810485	*	34	0
06-Nov-81	810912	*	77	0

12-Nov-81	811219	*	107	0
18-Nov-81	811202	*	75	0
24-Nov-81	811212	*	72	0
30-Nov-81	811206	*	0	9
06-Dec-81	811382	*	36	0
12-Dec-81	811160	*	84	0
18-Dec-81	811168	*	56	0
24-Dec-81	811389	*	43	0
30-Dec-81	811372	*	54	0
05-Jan-82	811367	*	87	0
11-Jan-82	811317	*	48	0
17-Jan-82	811198	*	53	0
23-Jan-82	881323	*	52	0
29-Jan-82	811328	*	58	0
04-Feb-82	811129	*	60	0
10-Feb-82	811333	*	61	0
16-Feb-82	820079	*	54	0
22-Feb-82	811125	*	70	0
28-Feb-82	820062	*	63	0
06-Mar-82	820201	*	43	0
12-Mar-82	820241	*	0	14
18-Mar-82	820258	*	0	14
24-Mar-82	820223	*	50	0
30-Mar-82	820231	*	69	0
05-Apr-82	820122	*	0	1
11-Apr-82	820418	*	34	1
17-Apr-82	820126	*	38	0
23-Apr-82	820476	*	77	0
29-Apr-82	820461	*	77	0
05-May-82	820468	*	57	0
11-May-82	820470	*	61	0
17-May-82	820521	*	33	0
23-May-82	820527	*	46	0
29-May-82	820503	*	44	0
04-Jun-82	820507	*	47	0
10-Jun-82	820512	*	85	0
16-Jun-82	820551	*	47	0
22-Jun-82	820778	*	56	0
28-Jun-82	820767	*	62	0
04-Jul-82	820772	*	42	0
10-Jul-82	820723	*	54	0
16-Jul-82	820725	*	45	0
22-Jul-82	820730	*	113	0
28-Jul-82	820914	*	82	0
03-Aug-82	820911	0.3	74	0
09-Aug-82	820905	0.4	69	0
15-Aug-82	820782	0.3	49	0
21-Aug-82	820934	*	48	12
27-Aug-82	820384	0.3	73	0
02-Sep-82	820817	0.3	69	0
08-Sep-82	820814	0.3	85	0
14-Sep-82	000000	0.3	63	12
20-Sep-82	000000	*	*	12
26-Sep-82	000000	*	*	12
02-Oct-82	000000	*	*	8
08-Oct-82	820992	0.2	30	0
14-Oct-82	820885	0.9	79	0
20-Oct-82	820843	0.2	53	0
26-Oct-82	821022	0.7	61	0
01-Nov-82	821037	0.2	32	0
07-Nov-82	821033	0.1	31	0
13-Nov-82	821029	0.3	31	0
19-Nov-82	821076	0.2	36	0
25-Nov-82	821062	0.2	28	0
01-Dec-82	821201	0.1	41	5
07-Dec-82	821201	0.8	60	5
13-Dec-82	821213	*	44	5
19-Dec-82	821207	0.2	52	5
25-Dec-82	821297	0.1	37	0
31-Dec-82	821293	0.4	37	0
06-Jan-83	821287	0.6	47	0
12-Jan-83	830036	0.3	43	0
18-Jan-83	830032	0.2	42	0
24-Jan-83	830028	0.6	55	0
30-Jan-83	830078	0.4	29	0
05-Feb-83	830061	0.2	22	0
11-Feb-83	830068	0.8	52	0
17-Feb-83	830240	1.3	80	0
23-Feb-83	830257	0.5	73	0
01-Mar-83	830255	0.4	59	0
07-Mar-83	830250	0.4	41	0
13-Mar-83	830286	0.1	45	0
19-Mar-83	830291	0.3	55	0
25-Mar-83	830298	0.2	44	0
31-Mar-83	830338	0.4	69	0
06-Apr-83	830327	0.1	28	0
12-Apr-83	830329	0.2	62	0
18-Apr-83	830333	0.3	59	0
24-Apr-83	830146	0.4	51	0
30-Apr-83	830396	0.1	64	0
06-May-83	830391	0.2	88	0
12-May-83	830678	0.2	71	0
18-May-83	830672	0.4	58	0
24-May-83	830669	0.5	66	0

30-May-83	830161	*	*	5
05-Jun-83	830170	0.2	38	0
11-Jun-83	830514	*	*	8
17-Jun-83	830508	*	*	8
23-Jun-83	830538	*	*	5
29-Jun-83	830524	*	*	5
05-Jul-83	830878	*	*	05
11-Jul-83	830865	0.2	61	0
17-Jul-83	830562	0.1	61	0
23-Jul-83	830570	0.1	81	0
29-Jul-83	830961	0.2	92	0
04-Aug-83	830964	*	58	0
10-Aug-83	830972	*	69	0
16-Aug-83	831073	*	83	0
22-Aug-83	831071	*	60	0
28-Aug-83	831194	*	85	0
03-Sep-83	831183	*	48	0
09-Sep-83	831183	*	47	0
15-Sep-83	831272	*	105	0
21-Sep-83	831262	*	59	0
27-Sep-83	831378	*	79	0
03-Oct-83	831364	*	86	0
09-Oct-83	831438	*	92	0
15-Oct-83	831429	*	68	0
21-Oct-83	831480	*	19	0
27-Oct-83	831489	*	102	0
02-Nov-83	831616	*	*	13
08-Nov-83	831601	*	54	0
14-Nov-83	831607	*	73	0
20-Nov-83	831669	*	31	0
26-Nov-83	831779	*	28	0
02-Dec-83	831176	*	41	0
08-Dec-83	831768	*	72	0
14-Dec-83	831841	*	53	0
20-Dec-83	831851	*	79	0
26-Dec-83	831900	*	*	15
01-Jan-84	831918	0.4	55	0
07-Jan-84	831909	1	107	0
13-Jan-84	840004	0.1	66	0
19-Jan-84	840012	0.2	64	0
25-Jan-84	840078	1	125	0
31-Jan-84	840069	1.1	99	0
06-Feb-84	840117	0.3	56	0
12-Feb-84	840261	0.5	51	0
18-Feb-84	840145	0.1	70	0
24-Feb-84	840360	0.4	63	0
01-Mar-84	840319	0.3	62	0
07-Mar-84	840311	0.2	68	0
13-Mar-84	840456	0.2	63	0
19-Mar-84	840490	0.1	99	0
25-Mar-84	840581	0.3	52	0
31-Mar-84	840597	*	*	16
06-Apr-84	840630	0.4	92	0
12-Apr-84	840636	0.3	106	0
18-Apr-84	840767	0.3	127	0
24-Apr-84	840776	0.2	116	0
30-Apr-84	840687	0.3	108	0
06-May-84	840697	0.2	109	0
12-May-84	840968	0.2	63	0
18-May-84	840985	0.3	77	0
24-May-84	000000	*	*	15
30-May-84	841105	*	*	12
05-Jun-84	841172	0.1	40	0
11-Jun-84	841232	0.2	57	0
17-Jun-84	841297	*	*	12
23-Jun-84	841283	0.2	63	0
29-Jun-84	841286	0.2	74	0
05-Jul-84	841518	0.1	52	0
11-Jul-84	841509	0.2	93	0
17-Jul-84	841539	0.2	113	0
23-Jul-84	841529	0.3	120	0
29-Jul-84	841641	0.1	62	0
04-Aug-84	841651	0.3	68	0
10-Aug-84	841709	0.3	96	0
16-Aug-84	841755	0.3	97	0
22-Aug-84	841846	0.2	75	0
28-Aug-84	841939	0.2	103	0
03-Sep-84	841931	0.2	53	0
09-Sep-84	841921	*	*	13
15-Sep-84	842008	*	*	9
21-Sep-84	842014	0.3	132	0
27-Sep-84	842198	0.2	67	0
03-Oct-84	942134	*	*	12
09-Oct-84	842261	0.5	99	0
15-Oct-84	842279	0.2	59	0
21-Oct-84	842274	0.1	32	0
27-Oct-84	842384	0.1	33	0
02-Nov-84	842392	0.2	55	0
08-Nov-84	842512	0.1	69	0
14-Nov-84	842508	0.2	71	0
20-Nov-84	842561	1	57	0
26-Nov-84	842678	0.6	47	0
02-Dec-84	842595	0.1	54	0
08-Dec-84	842795	0.4	53	0
14-Dec-84	842661	0.2	28	0

20-Dec-84	842581	0.3	45	0
26-Dec-84	842958	0.2	31	0
01-Jan-85	842958	0.1	31	0
07-Jan-85	842965	*	*	5
13-Jan-85	850002	0.1	44	0
19-Jan-85	850011	0.4	123	0
25-Jan-85	850079	0.5	135	0
31-Jan-85	850137	0.1	62	0
06-Feb-85	850221	0.3	98	0
12-Feb-85	850287	0.6	100	0
18-Feb-85	850291	0.1	70	0
24-Feb-85	850362	0.1	35	0
02-Mar-85	850399	0.2	55	0
08-Mar-85	850478	0.2	83	0
14-Mar-85	850387	0.2	46	0
20-Mar-85	850480	0.1	43	0
26-Mar-85	850410	0.1	104	0
01-Apr-85	850403	0.1	65	0
07-Apr-85	850719	0.1	64	0
13-Apr-85	850758	0.2	46	0
19-Apr-85	850646	0.1	82	0
25-Apr-85	850903	*	*	16
01-May-85	850832	0.3	58	0
07-May-85	850982	0.3	89	0
13-May-85	850965	0.1	62	0
19-May-85	850971	0.2	49	0
25-May-85	851118	0.1	78	0
31-May-85	851148	0.1	106	0
06-Jun-85	851223	0.1	40	0
12-Jun-85	851243	0.1	66	0
18-Jun-85	851266	0.2	60	0
24-Jun-85	851285	0.2	71	0
30-Jun-85	852421	0.5	99	0
06-Jul-85	851452	0.2	82	0
12-Jul-85	851587	0.1	104	0
18-Jul-85	851595	0.1	84	0
24-Jul-85	851643	0.1	94	0
30-Jul-85	851689	0.1	94	0
05-Aug-85	851761	0.1	68	0
11-Aug-85	851854	0.2	84	0
17-Aug-85	851731	0.1	63	0
23-Aug-85	851905	0.1	67	0
29-Aug-85	851984	0.2	153	0
04-Sep-85	852036	*	*	2
10-Sep-85	851746	0.1	59	0
16-Sep-85	852129	0.2	76	0
22-Sep-85	852135	0.1	67	0
28-Sep-85	852186	0.1	56	0
04-Oct-85	851447	0.1	139	0
10-Oct-85	852275	0.1	46	0
16-Oct-85	852402	0.2	66	0
22-Oct-85	852419	0.2	66	0
28-Oct-85	000000	*	*	15
03-Nov-85	852579	0.2	64	0
09-Nov-85	852626	0	68	0
15-Nov-85	852722	0.1	14	0
21-Nov-85	852775	0.1	41	0
27-Nov-85	852772	0.1	19	0
03-Dec-85	852856	0.1	47	0
09-Dec-85	852816	0.1	52	0
15-Dec-85	852982	0.1	39	0
21-Dec-85	853024	0.2	78	0
27-Dec-85	853101	0.2	72	0
02-Jan-86	860000	0.1	71	0
08-Jan-86	860039	0	54	0
14-Jan-86	860082	0.3	132	0
20-Jan-86	860178	0.4	111	0
26-Jan-86	860218	0	48	0
01-Feb-86	860204	0.1	53	0
07-Feb-86	852908	0.1	38	0
13-Feb-86	860262	*	*	8
19-Feb-86	860262	*	*	8
25-Feb-86	860518	0.2	125	0
03-Mar-86	860478	0.1	77	0
09-Mar-86	860581	0	73	0
15-Mar-86	860592	0.2	51	0
21-Mar-86	860742	0.1	68	0
27-Mar-86	860798	0.2	105	0
02-Apr-86	860617	0.1	86	0
08-Apr-86	860836	0.1	101	0
14-Apr-86	860901	0.1	96	0
20-Apr-86	860914	0.1	33	0
26-Apr-86	860966	0.1	59	0
02-May-86	860978	*	*	3
08-May-86	861093	0.1	72	0
14-May-86	861185	0.1	74	0
20-May-86	861242	0.1	80	0
26-May-86	861249	0.1	54	0
01-Jun-86	861341	0.1	33	0
07-Jun-86	861356	0.1	46	0
13-Jun-86	861388	0.1	75	0
19-Jun-86	861398	0.3	75	0
25-Jun-86	861551	0.2	104	0
01-Jul-86	861668	0.1	95	0

07-Jul-86	861615	0.1	116	0
13-Jul-86	861802	0.1	77	0
19-Jul-86	861813	0.2	81	0
25-Jul-86	861847	0.1	72	0
31-Jul-86	862000	0.1	93	0
06-Aug-86	862007	0.1	60	0
12-Aug-86	862074	0.1	56	0
18-Aug-86	862066	*	*	8
24-Aug-86	000000	*	*	8
30-Aug-86	862131	0.1	63	0
05-Sep-86	862309	*	41	0
11-Sep-86	862382	*	*	15
17-Sep-86	862415	*	67	0
23-Sep-86	862104	*	58	0
29-Sep-86	862515	*	58	0
05-Oct-86	862541	0	24	0
11-Oct-86	862569	0.1	31	0
17-Oct-86	862720	0.2	86	0
23-Oct-86	862749	0.1	21	0
29-Oct-86	862813	0.3	99	0
04-Nov-86	862820	*	27	0
10-Nov-86	862868	*	33	0
16-Nov-86	862891	*	35	0
22-Nov-86	862963	*	48	0
28-Nov-86	863059	*	47	0
04-Dec-86	863089	*	80	0
10-Dec-86	863173	*	33	0
16-Dec-86	863263	*	71	0
22-Dec-86	863317	*	37	0
28-Dec-86	863349	*	60	0
03-Jan-87	863390	*	29	0
09-Jan-87	863407	99	35	0
15-Jan-87	863512	*	*	18
21-Jan-87	863522	*	97	0
27-Jan-87	863550	*	88	0
02-Feb-87	870012	0.1	90	0
08-Feb-87	870052	*	*	10
14-Feb-87	870031	0.1	32	0
20-Feb-87	870102	0	32	0
26-Feb-87	870166	0.1	18	0
04-Mar-87	870226	*	103	0
10-Mar-87	870203	*	51	0
16-Mar-87	870310	*	49	0
22-Mar-87	870346	*	70	0
28-Mar-87	870357	*	47	0
03-Apr-87	870433	0.2	56	0
09-Apr-87	870495	0.2	66	0
15-Apr-87	870512	0.2	69	0
21-Apr-87	870630	0.1	49	0
27-Apr-87	870238	0.3	104	0
03-May-87	870682	0.2	57	0
09-May-87	870694	0.1	72	0
15-May-87	870803	0.1	64	0
21-May-87	870816	0.2	61	0
27-May-87	870869	0.1	72	0
02-Jun-87	870878	0	48	0
08-Jun-87	870911	*	*	19
14-Jun-87	870981	*	*	19
20-Jun-87	870988	0	43	0
26-Jun-87	871029	0	65	0
02-Jul-87	871080	0.3	75	0
08-Jul-87	871104	0	47	0
14-Jul-87	871130	0.1	42	0
20-Jul-87	871206	0.1	88	0
26-Jul-87	871212	0	58	0
01-Aug-87	871222	0	57	0
07-Aug-87	871236	0.1	97	0
13-Aug-87	871249	0.1	116	0
19-Aug-87	871348	0	119	
25-Aug-87	871383	0	80	0
31-Aug-87	871426	0	46	0
06-Sep-87	871488	0	67	0
12-Sep-87	871522	0	48	0
18-Sep-87	871550	0	32	0
24-Sep-87	871562	0.1	77	0
30-Sep-87	871575	0.1	77	0
06-Oct-87	871623	0.1	109	0
12-Oct-87	871613	0.1	78	0
18-Oct-87	871655	0.1	67	0
24-Oct-87	871708	0.1	33	0
30-Oct-87	871787	0.1	63	0
05-Nov-87	871801	0.1	64	0
11-Nov-87	871743	0.2	68	0
17-Nov-87	871829	0.1	45	0
23-Nov-87	871870	0	54	0
29-Nov-87	871859	0.1	41	0
05-Dec-87	871923	0.1	46	0
11-Dec-87	871939	*	*	19
17-Dec-87	872007	0.2	58	0
23-Dec-87	872063	*	*	5
29-Dec-87	871971	0.1	37	0
04-Jan-88	872098	0.2	58	0
10-Jan-88	880020	0.1	95	0
16-Jan-88	880065	*	*	5

22-Jan-88	880077	0.1	88	0
28-Jan-88	880113	*	*	19
03-Feb-88	880185	0	40	0
09-Feb-88	871895	0.1	70	0
15-Feb-88	880243	0.1	50	0
21-Feb-88	880253	*	*	19
27-Feb-88	880231	*	*	8
04-Mar-88	880305	0.1	55	0
10-Mar-88	880319	0.2	88	0
16-Mar-88	880155	0	56	0
22-Mar-88	880333	0	55	0
28-Mar-88	880425	0	75	0
03-Apr-88	880437	0	53	0
09-Apr-88	880474	0	95	0
15-Apr-88	880550	0	60	0
21-Apr-88	880557	0	55	0
27-Apr-88	880568	0	54	0
03-May-88	880687	0.1	64	0
09-May-88	880703	0.1	124	0
15-May-88	880653	0	43	0
21-May-88	880643	0.1	30	0
27-May-88	000000	*	*	8
02-Jun-88	880780	*	*	8
08-Jun-88	000000	*	*	8
14-Jun-88	000000	*	*	17
20-Jun-88	000000	*	*	17
26-Jun-88	000000	*	*	17

STATION 131057

3004 N. Westmoreland
AMBIENT AIR QUALITY SURVEILLANCE

SAMPLE DATE	FILTER NUMBER	LEAD ug/cum	PARTICULATES ug/cum	REMARKS
16-Apr-83	830422	0.8	53	0
17-Apr-83	830438	1	68	0
18-Apr-83	TACB	*	*	
19-Apr-83	830426	0.3	79	0
20-Apr-83	830425	*	*	
21-Apr-83	TACB	0.7	54	0
22-Apr-83	830429	1.4	82	0
23-Apr-83	830430	0.7	52	0
24-Apr-83	TACB	0.5	45	0
25-Apr-83	830432	1.1	57	0
26-Apr-83	830433	1.4	78	0
27-Apr-83	TACB	1.3	57	0
28-Apr-83	830440	1.4	86	0
29-Apr-83	830446	2.1	60	0
30-Apr-83	TACB	0.4	65	0
01-May-83	830453	1.2	71	0
02-May-83	830452	1.6	61	0
03-May-83	TACB	0.7	53	0
04-May-83	830480	0.8	86	0
05-May-83	830499	1	97	0
06-May-83	TACB	2	61	0
07-May-83	830498	0.5	57	0
08-May-83	830489	0.5	36	0
01-Oct-83	831441	0.7	85	0
02-Oct-83	831440	0.7	57	0
03-Oct-83	TACB	*	*	
04-Oct-83	831457	0.8	99	0
05-Oct-83	831456	0.7	112	0
06-Oct-83	TACB	*	*	
07-Oct-83	831448	0.4	59	0
08-Oct-83	831449	0.3	53	0
09-Oct-83	TACB	*	*	
10-Oct-83	831519	1.3	121	0
11-Oct-83	831518	0.6	72	0
12-Oct-83	TACB	*	*	
13-Oct-83	831503	1.2	79	0
14-Oct-83	831502	0.8	52	0
15-Oct-83	TACB	*	*	
16-Oct-83	831540	0.5	43	0
17-Oct-83	831541	0.6	63	0
18-Oct-83	TACB	*	*	
19-Oct-83	831576	0.4	36	0
20-Oct-83	831575	0.5	33	0
21-Oct-83	TACB	*	*	
22-Oct-83	831557	0.4	33	0
23-Oct-83	831544	0.4	32	0
24-Oct-83	TACB	*	*	
25-Oct-83	831551	*	46	0
26-Oct-83	831550	*	120	0
28-Oct-83	831569	*	100	0
29-Oct-83	831568	*	64	0
31-Oct-83	831561	*	77	0
18-Nov-83	831706	*	*	
19-Nov-83	831702	.4	34	0
20-Nov-83	TACB	*	*	
21-Nov-83	831955	*	58	0
22-Nov-83	831954	*	*	
23-Nov-83	TACB	*	*	
24-Nov-83	831944	*	*	
25-Nov-83	831943	0.2	26	0
25-Nov-83	831943	*	26	0
26-Nov-83	TACB	*	*	
27-Nov-83	831623	0.1	33	0
27-Nov-83	831623	*	33	0
28-Nov-83	831624	0.4	51	0
28-Nov-83	831624	*	51	0
29-Nov-83	TACB	*	*	
30-Nov-83	831802	0.3	44	0
30-Nov-83	831802	*	44	0
01-Dec-83	831803	0.5	54	0
02-Dec-83	TACB	*	*	
03-Dec-83	831941	0.2	22	0
04-Dec-83	831837	0.6	42	0
05-Dec-83	TACB	*	*	
06-Dec-83	831830	0.7	31	0
07-Dec-83	831829	*	*	
08-Dec-83	TACB	*	*	
09-Dec-83	831825	0.6	65	0
10-Dec-83	831824	0.7	230	0
11-Dec-83	TACB	*	57	
13-Dec-83	831878	*	87	0
15-Dec-83	831807	*	30	0
16-Dec-83	831808	*	45	0
18-Dec-83	831811	*	28	0
19-Dec-83	831812	*	*	8

21-Dec-83	831864	*	35	0
22-Dec-83	831871	*	78	0
24-Dec-83	831868	*	38	0
25-Dec-83	831869	*	38	0
27-Dec-83	831920	*	39	0
28-Dec-83	831921	*	44	0
30-Dec-83	831926	*	76	0
31-Dec-83	831925	*	54	0
01-Jan-84	TACB	*	*	
02-Jan-84	831927	0.8	54	0
03-Jan-84	831928	1.1	125	0
04-Jan-84	TACB	*	*	
05-Jan-84	831996	1.4	121	0
06-Jan-84	831995	0.7	88	0
07-Jan-84	TACB	*	*	
08-Jan-84	831993	0.9	80	0
09-Jan-84	831963	0.2	31	0
10-Jan-84	TACB	*	*	
11-Jan-84	831990	0.7	78	0
12-Jan-84	831989	0.3	73	0
13-Jan-84	TACB	*	*	0
14-Jan-84	831984	0.1	55	0
15-Jan-84	831983	0.1	66	0
16-Jan-84	TACB	*	*	
17-Jan-84	831964	0.5	76	0
18-Jan-84	831965	0.4	75	0
19-Jan-84	TACB	*	*	
20-Jan-84	840039	0.2	35	0
21-Jan-84	840038	0.9	56	0
22-Jan-84	TACB	*	*	
23-Jan-84	840027	0.3	43	0
24-Jan-84	840028	1.1	98	0
25-Jan-84	TACB	*	*	
26-Jan-84	840136	4.4	132	0
27-Jan-84	840129	0.8	78	0
28-Jan-84	TACB	*	*	
29-Jan-84	840124	1	74	0
30-Jan-84	840123	0.6	59	0
31-Jan-84	TACB	*	*	
01-Feb-84	840209	1.9	88	0
02-Feb-84	840157	1.8	73	0
03-Feb-84	TACB	*	*	
04-Feb-84	840241	0.1	55	0
05-Feb-84	840207	0.6	59	0
06-Feb-84	TACB	*	*	
07-Feb-84	840141	0.9	54	0
08-Feb-84	840142	0.4	44	0
09-Feb-84	TACB	*	*	
10-Feb-84	840242	1.3	58	0
11-Feb-84	840247	1	40	0
12-Feb-84	TACB	*	*	
13-Feb-84	840298	1.2	82	0
14-Feb-84	840297	1.3	74	0
15-Feb-84	TACB	*	*	
16-Feb-84	840290	1.4	75	0
17-Feb-84	840282	0.8	79	0
18-Feb-84	TACB	*	*	
19-Feb-84	840289	0.2	16	0
20-Feb-84	840287	0.3	36	0
21-Feb-84	TACB	*	*	
22-Feb-84	840329	1.2	101	0
23-Feb-84	840330	1.8	87	0
24-Feb-84	TACB	*	*	
25-Feb-84	840367	0.6	46	0
26-Feb-84	840366	0.3	40	0
27-Feb-84	TACB	*	*	
28-Feb-84	840364	0.1	19	0
29-Feb-84	840365	0.6	55	0
01-Mar-84	TACB	*	*	
02-Mar-84	840397	0.3	49	0
03-Mar-84	840396	0.3	46	0
04-Mar-84	TACB	*	*	
05-Mar-84	840389	0.1	16	0
06-Mar-84	840388	0.4	37	0
07-Mar-84	TACB	*	*	
08-Mar-84	840429	0.2	49	0
09-Mar-84	840430	0.3	58	0
10-Mar-84	TACB	*	*	
11-Mar-84	840496	0.2	40	0
12-Mar-84	840527	0.4	52	0
13-Mar-84	TACB	*	*	
14-Mar-84	840524	0.3	43	0
15-Mar-84	840493	0.4	42	0
16-Mar-84	TACB	*	*	
17-Mar-84	840549	0.2	40	0
18-Mar-84	840548	0.1	187	
19-Mar-84	TACB	*	*	
20-Mar-84	840575	0.2	31	0
21-Mar-84	840574	0.6	70	0
22-Mar-84	TACB	*	*	
23-Mar-84	840571	0.2	27	0
24-Mar-84	840570	0.2	29	0
25-Mar-84	TACB	*	*	
26-Mar-84	840657	0.7	73	0
27-Mar-84	840656	0.3	108	0

28-Mar-84	TACB	*	*	
29-Mar-84	840592	0.3	37	0
30-Mar-84	840591	0.3	50	0
31-Mar-84	TACB	*	*	
01-Apr-84	840709	0.2	58	0
02-Apr-84	840706	0.3	100	0
04-Apr-84	840667	0.1	41	0
05-Apr-84	840710	0.8	74	0
07-Apr-84	840733	0.1	28	0
08-Apr-84	840732	0.2	36	0
10-Apr-84	840728	0.4	148	0
11-Apr-84	840727	0.3	78	0
13-Apr-84	840788	0.6	77	0
14-Apr-84	840787	0.2	65	0
16-Apr-84	840859	0.4	54	0
17-Apr-84	840858	0.7	91	0
19-Apr-84	840879	0.2	80	0
20-Apr-84	840878	0.6	225	0
22-Apr-84	840718	0.1	41	0
23-Apr-84	840717	0.5	66	0
25-Apr-84	840865	0.4	58	0
26-Apr-84	840864	0.4	91	0
28-Apr-84	840907	0.4	118	0
29-Apr-84	840906	*	*	
01-May-84	840924	0.3	63	0
02-May-84	840925	0.7	99	0
03-May-84	TACB	*	*	
04-May-84	840997	0.3	68	0
05-May-84	840996	0.3	90	0
06-May-84	TACB	*	*	
07-May-84	840947	0.2	86	0
08-May-84	840946	0.3	43	0
09-May-84	TACB	*	*	
10-May-84	841029	1.7	93	0
11-May-84	841028	1.3	64	0
12-May-84	TACB	*	*	
13-May-84	841043	0.5	46	0
14-May-84	841053	1.1	74	0
15-May-84	TACB	*	*	
16-May-84	841134	0.4	92	0
17-May-84	841133	0.4	98	0
18-May-84	TACB	*	*	
19-May-84	841122	0.4	30	0
20-May-84	841121	0.2	32	0
21-May-84	TACB	*	*	
22-May-84	841147	0.7	57	0
23-May-84	841146	0.2	54	0
24-May-84	TACB	*	*	
25-May-84	841179	0.6	69	0
26-May-84	841178	0.2	40	0
27-May-84	TACB	*	*	
28-May-84	841188	0.1	34	0
30-May-84	TACB	*	*	
31-May-84	841187	*	*	
01-Jun-84	841217	0.4	63	0
02-Jun-84	TACB	*	*	
03-Jun-84	841192	0.2	40	0
04-Jun-84	841191	0.4	47	0
06-Jun-84	841209	0.3	27	0
09-Jun-84	841205	0.1	37	0
10-Jun-84	841204	0.1	38	0
12-Jun-84	841305	0.2	57	0
13-Jun-84	841304	0.3	53	0
15-Jun-84	841358	0.6	67	0
16-Jun-84	841357	0.5	52	0
18-Jun-84	841346	0.9	71	0
19-Jun-84	841345	0.7	86	0
21-Jun-84	841369	0.8	145	0
22-Jun-84	841368	0.8	87	0
24-Jun-84	841393	0.1	45	0
25-Jun-84	841391	0.3	86	0
27-Jun-84	841439	0.4	83	0
28-Jun-84	841438	0.7	90	0
30-Jun-84	841429	0.2	43	0
01-Jul-84	841428	0.1	57	0
02-Jul-84	TACB	*	*	
03-Jul-84	841493	0.8	73	0
04-Jul-84	841492	0.2	58	0
05-Jul-84	TACB	*	*	
06-Jul-84	841477	0.5	71	0
07-Jul-84	841478	0.3	66	0
08-Jul-84	TACB	*	*	
09-Jul-84	841544	0.5	51	0
10-Jul-84	841545	0.9	69	0
11-Jul-84	TACB	*	*	
12-Jul-84	000000	*	*	
13-Jul-84	000000	*	*	
14-Jul-84	TACB	*	*	
15-Jul-84	841470	0.2	44	0
16-Jul-84	841469	0.4	73	0
17-Jul-84	TACB	*	*	
18-Jul-84	841566	0.2	78	0
19-Jul-84	841565	0.2	84	0
20-Jul-84	TACB	*	*	
21-Jul-84	841614	0.4	81	0
22-Jul-84	841615	0.4	84	0

23-Jul-84	TACB	•	•	
24-Jul-84	000000	•	•	
25-Jul-84	841659	0.5	91	0
26-Jul-84	TACB	•	•	
27-Jul-84	841658	0.6	93	
28-Jul-84	841625	0.4	63	
29-Jul-84	TACB	•	•	
30-Jul-84	841681	0.2	72	0
31-Jul-84	841680	0.5	122	0
02-Aug-84	841734	0.3	123	0
03-Aug-84	841733	0.4	98	0
05-Aug-84	000000	•	•	8
06-Aug-84	841725	0.5	57	0
08-Aug-84	841724	0.7	94	0
09-Aug-84	841750	0.6	87	0
11-Aug-84	841765	0.4	54	0
12-Aug-84	841766	0.5	49	0
14-Aug-84	841125	0.4	80	0
15-Aug-84	841811	0.3	67	0
17-Aug-84	841877	0.4	97	0
18-Aug-84	841878	0.7	139	0
20-Aug-84	841872	0.4	118	0
21-Aug-84	841871	0.4	69	0
23-Aug-84	841899	0.3	73	0
24-Aug-84	841898	0.2	73	0
26-Aug-84	841972	0.3	64	0
27-Aug-84	841973	0.6	86	0
29-Aug-84	841978	0.5	117	0
30-Aug-84	841977	0.4	126	0
01-Sep-84	841881	0.4	63	0
02-Sep-84	841886	0.1	36	0
04-Sep-84	842041	0.2	48	0
05-Sep-84	842040	0.8	106	0
07-Sep-84	842047	0.3	43	0
08-Sep-84	842046	0.6	77	0
10-Sep-84	842070	0.4	48	0
11-Sep-84	842069	0.4	52	0
13-Sep-84	842062	0.5	112	0
14-Sep-84	842061	0.6	136	0
16-Sep-84	842080	0.1	36	0
17-Sep-84	842081	0.2	60	0
19-Sep-84	842117	0.2	88	0
20-Sep-84	842116	0.5	142	0
22-Sep-84	842177	0.3	50	0
23-Sep-84	842176	0.2	41	0
25-Sep-84	842163	0.3	69	0
26-Sep-84	842162	0.2	32	0
28-Sep-84	842187	0.1	25	0
29-Sep-84	842190	0.1	33	0
01-Oct-84	842235	0.8	72	0
02-Oct-84	842234	0.4	128	0
04-Oct-84	842256	0.4	81	0
05-Oct-84	842255	0.4	53	0
07-Oct-84	842249	0.3	38	0
08-Oct-84	842248	0.9	110	0
10-Oct-84	842210	0.4	62	0
11-Oct-84	842201	0.4	87	0
13-Oct-84	842316	0.2	20	0
14-Oct-84	842315	0.3	34	0
16-Oct-84	842377	0.2	108	.0
17-Oct-84	842376	0.3	70	0
19-Oct-84	842368	0.2	65	0
20-Oct-84	842360	0.5	35	0
22-Oct-84	842441	0.1	21	0
23-Oct-84	842440	0.1	19	0
25-Oct-84	842415	0.2	25	0
26-Oct-84	842401	0.4	52	0
28-Oct-84	842457	0.4	52	0
29-Oct-84	842456	0.6	59	0
31-Oct-84	842404	0.3	46	0
01-Nov-84	842471	0.2	31	0
03-Nov-84	842520	0.2	33	0
04-Nov-84	842521	0.3	52	0
06-Nov-84	842537	0.9	92	0
07-Nov-84	842536	0.9	56	0
09-Nov-84	842549	1	107	0
10-Nov-84	842548	0.2	81	0
12-Nov-84	842600	1.6	55	0
13-Nov-84	842601	0.5	58	0
15-Nov-84	842616	0.4	66	0
16-Nov-84	842615	0.2	98	0
18-Nov-84	842295	0.1	12	0
19-Nov-84	842281	0.1	29	0
21-Nov-84	842283	0.8	94	0
22-Nov-84	842699	1	72	0
24-Nov-84	842691	0.4	54	0
27-Nov-84	842734	0.3	10	0
28-Nov-84	842733	0.7	70	0
30-Nov-84	842757	0.9	101	0
01-Dec-84	842742	0.5	17	0
03-Dec-84	842743	0.2	51	0
04-Dec-84	842742	0.1	17	0
06-Dec-84	000000	•	•	15
07-Dec-84	842775	0.7	87	0
09-Dec-84	842772	0.6	80	0
10-Dec-84	842786	1.2	146	0

12-Dec-84	842860	0.7	76	0
13-Dec-84	842861	0.3	42	0
15-Dec-84	842867	*	*	18
16-Dec-84	000000	*	*	18
18-Dec-84	000000	*	*	4
19-Dec-84	842866	0.5	60	0
21-Dec-84	842894	0.8	69	0
22-Dec-84	842893	0.6	63	0
24-Dec-84	842589	0.2	50	0
25-Dec-84	842588	0.2	32	0
27-Dec-84	842827	0.2	56	0
28-Dec-84	842826	0.2	36	0
30-Dec-84	842909	0.1	19	0
31-Dec-84	842915	0.1	14	0
02-Jan-85	842982	0.1	20	0
03-Jan-85	842983	0.3	74	0
05-Jan-85	842946	0.6	105	0
06-Jan-85	842947	0.5	77	0
08-Jan-85	842955	0.9	160	0
09-Jan-85	842954	0.3	65	0
11-Jan-85	840899	0.1	41	0
12-Jan-85	840898	0.1	40	0
14-Jan-85	840887	0.4	69	0
15-Jan-85	840886	0.4	64	0
17-Jan-85	850050	0.5	97	0
18-Jan-85	850049	0.7	118	0
20-Jan-85	850100	0.1	44	0
21-Jan-85	850109	0.4	78	0
23-Jan-85	850153	0.9	135	0
24-Jan-85	850152	0.9	135	0
26-Jan-85	850143	0.2	34	0
27-Jan-85	850142	0.2	28	0
29-Jan-85	850067	0.3	55	0
30-Jan-85	850066	0.2	51	0
01-Feb-85	850160	0.1	23	0
02-Feb-85	850161	0.2	72	0
04-Feb-85	850127	0.2	61	0
05-Feb-85	850126	*	*	4
07-Feb-85	850267	0.2	83	0
08-Feb-85	850266	0.7	93	0
10-Feb-85	850262	0.1	34	0
11-Feb-85	850263	0.3	53	0
13-Feb-85	850308	0.4	113	0
14-Feb-85	850459	0.5	88	0
16-Feb-85	850353	0.4	64	0
17-Feb-85	850352	0.2	59	0
19-Feb-85	850379	0.4	89	0
20-Feb-85	850378	0.3	69	0
22-Feb-85	850452	0.1	35	0
23-Feb-85	850451	*	*	18
25-Feb-85	850207	0.5	65	0
26-Feb-85	850208	0.6	68	0
28-Feb-85	850439	0.3	57	0
01-Mar-85	850438	0.4	78	0
03-Mar-85	850472	0.5	47	0
04-Mar-85	000000	*	*	18
06-Mar-85	850431	0.1	54	0
07-Mar-85	850473	0.2	50	0
09-Mar-85	850516	0.4	66	0
10-Mar-85	850515	0.3	63	0
12-Mar-85	850502	0.1	68	0
13-Mar-85	850501	0.2	80	0
15-Mar-85	850548	0.1	42	0
16-Mar-85	850547	0.1	42	0
18-Mar-85	850573	0.6	87	0
19-Mar-85	850572	0.3	47	0
21-Mar-85	850197	0.1	27	0
22-Mar-85	850196	0.4	74	0
24-Mar-85	850584	0.4	79	0
25-Mar-85	850585	0.2	73	0
27-Mar-85	850601	0.5	71	0
28-Mar-85	850600	0.3	79	0
30-Mar-85	850614	0.1	18	0
31-Mar-85	850615	0.2	30	0
02-Apr-85	850671	0.1	80	0
03-Apr-85	850672	0.4	68	0
04-Apr-85	850710	0.5	77	0
05-Apr-85	850701	0.3	92	0
06-Apr-85	850733	0.3	52	0
07-Apr-85	850709	0.1	36	0
08-Apr-85	850732	0.2	43	0
09-Apr-85	850749	0.2	49	0
10-Apr-85	850751	0.3	63	0
11-Apr-85	850750	0.3	62	0
12-Apr-85	850760	0.4	49	0
13-Apr-85	850779	0.2	38	0
14-Apr-85	850773	0.2	67	0
15-Apr-85	000000	*	*	7
16-Apr-85	000000	*	*	7
17-Apr-85	000000	*	*	7
18-Apr-85	000000	*	*	7
19-Apr-85	000000	*	*	7
20-Apr-85	000000	*	*	7
21-Apr-85	000000	*	*	7
22-Apr-85	000000	*	*	7

23-Apr-85	000000	*	*	7
24-Apr-85	000000	*	*	7
25-Apr-85	000000	*	*	7
26-Apr-85	000000	*	*	7
27-Apr-85	000000	*	*	7
28-Apr-85	000000	*	*	7
29-Apr-85	000000	*	*	7
30-Apr-85	000000	*	*	7
01-May-85	000000	*	*	7
02-May-85	000000	*	*	7
03-May-85	000000	*	*	7
04-May-85	000000	*	*	7
05-May-85	000000	*	*	7
06-May-85	000000	*	*	7
07-May-85	000000	*	*	7
08-May-85	000000	*	*	7
09-May-85	000000	*	*	7
10-May-85	000000	*	*	7
11-May-85	000000	*	*	7
12-May-85	000000	*	*	7
13-May-85	000000	*	*	7
14-May-85	000000	*	*	7
15-May-85	000000	*	*	7
16-May-85	000000	*	*	7
17-May-85	000000	*	*	7
18-May-85	000000	*	*	7
19-May-85	000000	*	*	7
20-May-85	000000	*	*	7
21-May-85	000000	*	*	7
22-May-85	000000	*	*	7
23-May-85	000000	*	*	7
24-May-85	000000	*	*	7
25-May-85	000000	*	*	7
26-May-85	000000	*	*	7
27-May-85	000000	*	*	7
28-May-85	000000	*	*	7
29-May-85	000000	*	*	7
30-May-85	000000	*	*	7
31-May-85	000000	*	*	7
01-Jul-85	000000	*	*	7
02-Jul-85	000000	*	*	7
03-Jul-85	000000	*	*	7
04-Jul-85	000000	*	*	7
05-Jul-85	000000	*	*	7
06-Jul-85	000000	*	*	7
07-Jul-85	000000	*	*	7
08-Jul-85	000000	*	*	7
09-Jul-85	000000	*	*	7
10-Jul-85	851577	0.5	118	0
11-Jul-85	851560	0.3	88	0
12-Jul-85	851579	0.1	106	0
13-Jul-85	851578	0.2	102	0
14-Jul-85	851567	0.2	65	0
15-Jul-85	851568	0.3	79	0
16-Jul-85	851611	0.3	135	0
17-Jul-85	851612	0.3	98	0
18-Jul-85	851602	0.2	83	0
19-Jul-85	851638	0.3	94	0
20-Jul-85	851621	0.2	50	0
21-Jul-85	851640	*	*	8
22-Jul-85	851641	0.5	109	0
23-Jul-85	851656	0.3	77	0
24-Jul-85	851654	0.1	46	0
25-Jul-85	851655	0.5	101	0
26-Jul-85	851675	0.3	99	0
27-Jul-85	851676	0.2	62	0
28-Jul-85	851693	0.1	58	0
29-Jul-85	851694	0.3	94	0
30-Jul-85	851707	0.5	98	0
31-Jul-85	851706	0.4	128	0
01-Aug-85	851705	0.6	122	0
02-Aug-85	851765	0.2	117	0
03-Aug-85	851764	0.1	73	0
04-Aug-85	851763	0.1	51	0
05-Aug-85	851871	0.3	84	0
06-Aug-85	851840	0.3	100	0
07-Aug-85	851850	0.3	123	0
08-Aug-85	851858	0.3	85	0
09-Aug-85	851857	0.5	82	0
10-Aug-85	851830	0.2	93	0
11-Aug-85	851829	0.2	76	0
12-Aug-85	851828	0.6	81	0
13-Aug-85	851816	0.3	60	0
14-Aug-85	851815	0.3	72	0
15-Aug-85	851800	0.1	83	0
16-Aug-85	851804	0.3	88	0
17-Aug-85	851803	0.2	53	0
18-Aug-85	851888	0.2	45	0
19-Aug-85	851889	0.4	117	0
20-Aug-85	851909	0.7	120	0
21-Aug-85	851908	0.3	66	0
22-Aug-85	851907	0.6	86	0
23-Aug-85	851927	0.7	45	0
24-Aug-85	851926	0.3	73	0
25-Aug-85	851925	0.1	36	0
26-Aug-85	851956	0.2	75	0

27-Aug-85	851980	0.4	76	0
28-Aug-85	851981	0.3	83	0
29-Aug-85	851982	0.2	120	0
30-Aug-85	852020	0.3	101	0
31-Aug-85	852021	0.2	94	0
01-Sep-85	852039	0.2	84	0
02-Sep-85	852029	0.1	62	0
03-Sep-85	852040	0.3	99	0
04-Sep-85	852041	1.2	143	0
05-Sep-85	852060	1.8	78	0
06-Sep-85	852061	0.2	86	0
07-Sep-85	852062	0.5	70	0
08-Sep-85	852073	0.2	83	0
09-Sep-85	852074	0.3	99	0
10-Sep-85	852109	0.2	44	0
11-Sep-85	852110	0.3	47	0
12-Sep-85	852111	0.3	55	0
13-Sep-85	852142	0.4	67	0
14-Sep-85	852143	0.1	46	0
15-Sep-85	852144	0.2	68	0
16-Sep-85	852157	0.3	64	0
17-Sep-85	852164	2	79	0
18-Sep-85	852166	0.6	54	0
19-Sep-85	852165	0.4	60	0
20-Sep-85	852203	0.4	75	0
21-Sep-85	852204	0.3	88	0
22-Sep-85	852205	0.7	46	0
23-Sep-85	852248	0.1	41	0
24-Sep-85	852249	0.1	55	0
25-Sep-85	852250	0.3	86	0
26-Sep-85	852256	0.1	55	0
27-Sep-85	852259	1.5	48	0
28-Sep-85	852257	0.7	49	0
29-Sep-85	852286	0.1	21	0
30-Sep-85	852285	0.1	21	0
01-Oct-85	852306	0.2	55	0
02-Oct-85	852307	0.3	87	0
03-Oct-85	852324	0.6	61	0
04-Oct-85	852308	0.2	104	0
05-Oct-85	852323	0.4	119	0
06-Oct-85	852325	1.7	54	0
07-Oct-85	852345	0.2	48	0
08-Oct-85	852338	2.9	56	0
09-Oct-85	852347	0.2	52	0
10-Oct-85	852346	0.3	40	0
11-Oct-85	852366	0.2	53	0
12-Oct-85	852365	0.2	45	0
13-Oct-85	852377	0.1	30	0
14-Oct-85	852375	0.3	63	0
15-Oct-85	852391	0.2	53	0
17-Oct-85	852543	0.1	55	0
18-Oct-85	852556	0.1	30	0
19-Oct-85	852544	0.2	43	0
20-Oct-85	852549	0.2	52	0
21-Oct-85	852552	0.3	82	0
22-Oct-85	852486	0.3	65	0
23-Oct-85	852487	0.2	53	0
24-Oct-85	852497	0.3	78	0
25-Oct-85	852526	0.3	112	0
26-Oct-85	852536	0.2	71	0
27-Oct-85	852527	0.1	48	0
28-Oct-85	852561	0	40	0
29-Oct-85	852567	0	13	0
30-Oct-85	852568	0.1	29	0
31-Oct-85	852577	0.2	74	0
01-Nov-85	852589	0.3	91	0
02-Nov-85	852588	0.3	91	0
03-Nov-85	852590	0.3	86	0
04-Nov-85	852659	0.5	164	0
05-Nov-85	852661	0.5	112	0
06-Nov-85	852660	0.2	96	0
07-Nov-85	852662	0.3	87	0
08-Nov-85	852679	0.2	67	0
09-Nov-85	852667	0.2	48	0
10-Nov-85	852697	0.1	52	0
11-Nov-85	852696	0.1	47	0
12-Nov-85	852709	0.1	44	0
13-Nov-85	852710	0.1	45	0
14-Nov-85	852711	0.3	43	0
15-Nov-85	852692	0.1	21	0
16-Nov-85	852689	0.3	72	0
17-Nov-85	852779	0.1	20	0
18-Nov-85	852778	0.2	25	0
19-Nov-85	852780	0.1	47	0
20-Nov-85	852781	0	19	0
21-Nov-85	852782	0.1	44	0
22-Nov-85	852758	0.2	92	0
23-Nov-85	852747	0.1	61	0
24-Nov-85	852748	0.1	45	0
25-Nov-85	852768	0.1	35	0
26-Nov-85	852850	0.1	40	0
27-Nov-85	852851	0	21	0
28-Nov-85	852852	0	25	0
29-Nov-85	852875	0.1	33	0
30-Nov-85	852874	0	28	0
01-Dec-85	852860	0	14	0

02-Dec-85	852861	0.1	32	0
03-Dec-85	852899	0.1	48	0
04-Dec-85	852937	0.1	65	0
05-Dec-85	852936	*	*	8
06-Dec-85	999999	*	*	8
07-Dec-85	852956	0.3	89	0
08-Dec-85	852947	0.3	72	0
09-Dec-85	852946	0.1	37	0
10-Dec-85	852935	0.1	21	0
11-Dec-85	852960	0.1	16	0
12-Dec-85	852976	0.1	16	0
13-Dec-85	852966	*	*	8
14-Dec-85	000000	*	*	8
15-Dec-85	853038	0.2	44	0
16-Dec-85	853026	0.5	185	0
17-Dec-85	853011	0.6	179	0
18-Dec-85	853008	0.2	45	0
19-Dec-85	853061	0.4	111	0
20-Dec-85	853060	0.3	110	0
21-Dec-85	853062	0.3	92	0
22-Dec-85	853065	0.2	61	0
23-Dec-85	853066	0.3	98	0
24-Dec-85	853094	0.1	31	0
25-Dec-85	853095	0	17	0
26-Dec-85	853096	0.3	54	0
27-Dec-85	853087	0.2	60	0
28-Dec-85	853137	0.4	82	0
29-Dec-85	853136	0.3	85	0
30-Dec-85	853135	0.3	67	0
31-Dec-85	853194	0.1	44	0
01-Jan-86	853187	0.2	47	0
02-Jan-86	853193	0.3	78	0
03-Jan-86	000000	*	*	15
04-Jan-86	860047	0.2	75	0
05-Jan-86	860048	0.1	34	0
06-Jan-86	860060	0.4	60	0
07-Jan-86	860046	0.1	71	0
08-Jan-86	860016	*	*	3
09-Jan-86	860061	0.4	133	0
10-Jan-86	860062	0.5	198	0
11-Jan-86	860063	0.2	91	0
12-Jan-86	860076	0.1	75	0
13-Jan-86	860077	0.7	155	0
14-Jan-86	860111	0.4	171	0
15-Jan-86	860112	0.3	53	0
16-Jan-86	860113	0.2	36	0
17-Jan-86	860150	0.1	52	0
18-Jan-86	860151	0.2	47	0
19-Jan-86	860123	0.2	90	0
20-Jan-86	860122	0.4	110	0
21-Jan-86	860146	0.4	89	0
22-Jan-86	860147	0.1	62	0
23-Jan-86	860148	0.3	84	0
24-Jan-86	860223	1.7	71	0
25-Jan-86	860222	0.2	67	0
26-Jan-86	860224	0.1	48	0
27-Jan-86	860139	0.1	44	0
28-Jan-86	860256	0.3	78	0
29-Jan-86	860255	0.1	68	0
30-Jan-86	860254	0.2	67	0
31-Jan-86	860238	0.6	48	0
01-Feb-86	860239	0.1	25	0
02-Feb-86	860319	0.1	36	0
03-Feb-86	860318	0.1	28	0
04-Feb-86	860317	0.4	141	0
05-Feb-86	860325	0.2	51	0
06-Feb-86	860326	0.1	27	0
07-Feb-86	860327	0.1	32	0
08-Feb-86	860247	0.1	25	0
09-Feb-86	860248	0	19	0
10-Feb-86	860249	0	24	0
11-Feb-86	860351	0.1	34	0
12-Feb-86	860342	0	39	0
13-Feb-86	860343	0.2	44	0
14-Feb-86	860370	0.1	50	0
15-Feb-86	860371	0.1	45	0
16-Feb-86	860372	0.1	54	0
17-Feb-86	860396	0.2	115	0
18-Feb-86	860395	0.4	142	0
19-Feb-86	860394	0.4	162	0
20-Feb-86	860485	0.2	167	0
21-Feb-86	860487	0.1	44	0
22-Feb-86	860486	0.2	74	0
23-Feb-86	860502	0.3	76	0
24-Feb-86	860503	0.3	103	0
25-Feb-86	860537	0.3	149	0
26-Feb-86	860523	0.4	179	0
27-Feb-86	860536	0.1	74	0
28-Feb-86	860535	0.1	66	0
01-Mar-86	860546	0.2	58	0
02-Mar-86	860547	0.1	66	0
03-Mar-86	860552	0.3	96	0
04-Mar-86	860565	0.2	106	0
05-Mar-86	860564	0.4	117	0
06-Mar-86	860563	0.1	91	0

07-Mar-86	860623	0.2	51	0
08-Mar-86	860622	0.1	55	0
09-Mar-86	860621	0.7	69	0
10-Mar-86	860626	0.2	97	0
11-Mar-86	860641	0.6	100	0
12-Mar-86	860640	0.3	243	0
13-Mar-86	860672	0.2	72	0
14-Mar-86	860666	0.2	68	0
15-Mar-86	860673	0.2	44	0
16-Mar-86	860703	0.1	47	0
17-Mar-86	860719	0.4	55	0
18-Mar-86	000000	*	*	18
19-Mar-86	000000	*	*	18
20-Mar-86	860642	0.1	71	0
21-Mar-86	860645	0.3	72	0
22-Mar-86	860644	0.5	54	0
23-Mar-86	860643	0.1	33	0
24-Mar-86	860728	0.6	44	0
25-Mar-86	860760	0.4	50	0
26-Mar-86	860761	0.2	61	0
27-Mar-86	860762	0.2	92	0
28-Mar-86	860817	0.2	85	0
29-Mar-86	860802	0.3	74	0
30-Mar-86	860803	0.1	47	0
31-Mar-86	860795	0.2	49	0
01-Apr-86	860794	1.1	66	0
02-Apr-86	860789	1	92	0
03-Apr-86	860790	0.6	48	0
04-Apr-86	860878	0.3	51	0
05-Apr-86	860861	0.1	54	0
06-Apr-86	860844	0.1	52	0
07-Apr-86	860858	0.3	83	0
08-Apr-86	860857	0.1	66	0
09-Apr-86	860852	0.1	41	0
10-Apr-86	860853	0.4	57	0
11-Apr-86	860854	0.1	41	0
12-Apr-86	860886	0.2	44	0
13-Apr-86	860885	0.2	52	0
14-Apr-86	860887	0.1	66	0
15-Apr-86	860957	0.3	136	0
16-Apr-86	860958	0.1	79	0
17-Apr-86	860956	0.1	55	0
18-Apr-86	860995	0.1	55	0
19-Apr-86	860994	0.1	40	0
20-Apr-86	860945	0.1	42	0
21-Apr-86	860993	0.2	45	0
22-Apr-86	860802	0.1	52	0
23-Apr-86	860814	0.1	47	0
24-Apr-86	860988	0.1	37	0
25-Apr-86	860983	0.2	42	0
26-Apr-86	860984	0.1	43	0
27-Apr-86	861060	0.2	57	0
28-Apr-86	861061	0.2	77	0
29-Apr-86	861062	0.2	54	0
30-Apr-86	861400	0.1	39	0
01-May-86	861401	0.1	29	0
02-May-86	861419	0.1	48	0
03-May-86	861409	0.1	44	0
04-May-86	861416	0.2	70	0
05-May-86	000000	*	*	8
06-May-86	861100	0.1	47	0
07-May-86	861417	0.1	59	0
08-May-86	000000	*	*	4
09-May-86	861101	0.1	67	0
10-May-86	861146	0.1	29	0
11-May-86	861145	0.1	51	0
12-May-86	861157	0.2	83	0
13-May-86	861148	0.2	76	0
14-May-86	861176	0.2	51	0
15-May-86	861175	0.2	67	0
16-May-86	861239	0.2	68	0
17-May-86	861231	*	*	9
18-May-86	861230	0.1	30	0
19-May-86	861226	0.1	71	0
20-May-86	861263	0.2	88	0
21-May-86	861264	0.2	74	0
22-May-86	861265	0.2	45	0
23-May-86	861282	0.2	65	0
24-May-86	861292	0.1	41	0
25-May-86	861291	0.1	40	0
26-May-86	861290	0.1	48	0
27-May-86	861305	0.1	53	.0
28-May-86	861306	0.3	130	0
29-May-86	861318	0.2	160	0
30-May-86	861352	0.2	105	0
31-May-86	861353	0.1	44	0
01-Jun-86	861351	0.1	33	0
02-Jun-86	861332	0.2	58	0
03-Jun-86	861375	0.1	59	0
04-Jun-86	861374	0.1	61	0
05-Jun-86	861373	0.3	51	0
06-Jun-86	861370	0.3	91	0
07-Jun-86	861369	0.1	63	0
08-Jun-86	861460	0.1	42	0
09-Jun-86	861461	0.3	63	0

10-Jun-86	861462	0.3	59	0
11-Jun-86	000000	*	*	15
12-Jun-86	861467	0.2	144	0
13-Jun-86	861468	0.2	82	0
14-Jun-86	861469	0.1	62	0
15-Jun-86	861466	0.1	50	0
16-Jun-86	861505	0.3	79	0
17-Jun-86	861513	0.1	51	0
18-Jun-86	861514	0.2	69	0
19-Jun-86	861515	0.2	60	0
20-Jun-86	861535	0.2	59	0
21-Jun-86	861534	0.2	55	0
22-Jun-86	861533	*	*	8
23-Jun-86	861566	*	*	5
24-Jun-86	861573	0.3	106	0
25-Jun-86	000000	*	*	15
26-Jun-86	861640	0.1	59	0
27-Jun-86	861641	0.5	169	0
28-Jun-86	861642	0.2	133	0
29-Jun-86	861574	0.1	126	0
30-Jun-86	861755	0.3	86	0
01-Jul-86	861754	0.3	90	0
02-Jul-86	861744	0.2	93	0
03-Jul-86	861750	0.2	77	0
04-Jul-86	861745	0.1	100	0
05-Jul-86	861659	0.1	120	0
06-Jul-86	861658	0.1	111.1	0
07-Jul-86	861591	0.1	112	0
08-Jul-86	861585	0.2	111.1	0
09-Jul-86	861780	0.1	130	0
10-Jul-86	861781	0.2	91	0
11-Jul-86	861782	0.2	99	0
12-Jul-86	861820	0.2	108	0
13-Jul-86	861821	0.1	75	0
14-Jul-86	861674	0.2	97	0
15-Jul-86	861675	0.2	81	0
16-Jul-86	861678	0.2	58	0
17-Jul-86	861837	0.2	64	0
18-Jul-86	861831	0.3	93	0
19-Jul-86	000000	*	*	8
20-Jul-86	000000	*	*	8
21-Jul-86	000000	*	*	8
22-Jul-86	861896	0.1	67	0
23-Jul-86	861838	0.2	82	0
24-Jul-86	861882	*	*	4
25-Jul-86	861881	0.3	89	0
26-Jul-86	861922	0.2	71	0
27-Jul-86	861936	0.1	98	0
28-Jul-86	861923	0.2	129	0
29-Jul-86	861928	*	*	4
30-Jul-86	861929	0.2	109	0
01-Aug-86	861984	*	*	4
02-Aug-86	861985	*	*	4
03-Aug-86	861986	0.1	44	0
04-Aug-86	862039	0.2	74	0
05-Aug-86	862038	0.2	59	0
06-Aug-86	862036	0.3	58	0
07-Aug-86	862020	0.2	62	0
08-Aug-86	861994	0.3	70	0
09-Aug-86	862029	0.1	40	0
10-Aug-86	861955	0.1	59	0
11-Aug-86	861954	0.3	87	0
12-Aug-86	861944	0.1	54	0
13-Aug-86	862027	0.1	62	0
14-Aug-86	862025	0.2	57	0
15-Aug-86	862024	0.3	62	0
16-Aug-86	862088	0.2	63	0
17-Aug-86	862097	0.1	63	0
18-Aug-86	862878	*	*	4
19-Aug-86	862220	0.1	77	0
20-Aug-86	862221	0.2	108	0
21-Aug-86	862222	0.1	92	0
22-Aug-86	862241	0.1	89	0
23-Aug-86	862240	0.1	37	0
24-Aug-86	862242	0.1	32	0
25-Aug-86	862252	0.5	137	0
26-Aug-86	862251	0.4	112	0
27-Aug-86	862250	0.2	72	0
28-Aug-86	862272	0.2	46	0
29-Aug-86	862271	0.1	59	0
30-Aug-86	862273	0.1	56	0
31-Aug-86	862274	0.1	57	0
01-Sep-86	862275	0.1	38	0
02-Sep-86	862276	0.2	58	0
03-Sep-86	862297	0.6	105	0
04-Sep-86	862292	0.2	82	0
05-Sep-86	862298	0.1	50	0
06-Sep-86	862293	0.1	40	0
07-Sep-86	862296	0.1	42	0
08-Sep-86	862295	0.1	66	0
09-Sep-86	862369	0.1	55	0
10-Sep-86	862368	0.2	48	0
11-Sep-86	862370	0.2	71	0
12-Sep-86	862421	0.3	97	0
13-Sep-86	862439	0.2	56	0
14-Sep-86	862420	0.1	58	0

15-Sep-86	862424	0.2	73	0
16-Sep-86	862425	0.2	63	0
17-Sep-86	862426	*	*	5
18-Sep-86	862427	0.2	52	0
19-Sep-86	000000	*	*	8
20-Sep-86	000000	*	*	8
21-Sep-86	000000	*	*	8
22-Sep-86	000000	*	*	8
23-Sep-86	000000	*	*	8
24-Sep-86	000000	*	*	8
25-Sep-86	862440	*	*	5
26-Sep-86	862447	0.2	60	0
27-Sep-86	000000	*	*	10
28-Sep-86	000000	*	*	8
29-Sep-86	000000	*	*	8
30-Sep-86	862527	0.2	44	0
01-Oct-86	862529	*	*	4
02-Oct-86	862456	0.2	46	0
03-Oct-86	862613	0.2	75	0
04-Oct-86	862600	0.1	69	0
05-Oct-86	862457	*	*	5
06-Oct-86	862621	0.1	21	0
07-Oct-86	862620	0.1	53	0
08-Oct-86	862637	0.1	60	0
09-Oct-86	862624	*	*	5
10-Oct-86	862626	0.2	86	0
11-Oct-86	862625	0.1	21	0
12-Oct-86	862631	0.1	20	0
13-Oct-86	862632	*	*	5
14-Oct-86	862628	0.3	116	0
15-Oct-86	862714	0.5	217	0
16-Oct-86	862702	0.8	149	0
18-Oct-86	862705	0.2	*	0
19-Oct-86	862707	0.1	71	0
20-Oct-86	862706	0.1	52	0
21-Oct-86	862765	0.1	79	0
22-Oct-86	862775	0.1	66	0
23-Oct-86	862764	0.1	29	0
24-Oct-86	862797	0.1	20	0
25-Oct-86	862780	0.2	30	0
26-Oct-86	862798	0.1	83	0
27-Oct-86	861770	0.4	67	0
28-Oct-86	861769	*	110	8
29-Oct-86	861771	*	*	8
30-Oct-86	862794	0.2	*	0
31-Oct-86	862787	0.1	66	0
01-Nov-86	862788	0.1	71	0
02-Nov-86	862330	*	*	4
03-Nov-86	862329	0.2	77	0
04-Nov-86	000000	*	*	8
05-Nov-86	862856	0.1	31	0
06-Nov-86	862855	0.4	60	0
07-Nov-86	862854	0.2	42	0
08-Nov-86	862331	0.3	53	0
09-Nov-86	862845	0.2	81	0
10-Nov-86	862846	0.2	29	0
11-Nov-86	862915	0.2	28	0
12-Nov-86	862914	0.2	33	0
13-Nov-86	862913	0	29	0
14-Nov-86	862903	0.1	39	0
15-Nov-86	862905	0.1	38	0
16-Nov-86	832904	*	*	5
17-Nov-86	862934	*	*	8
18-Nov-86	862932	0.2	63	0
19-Nov-86	862931	0.3	70	0
20-Nov-86	863072	0.3	53	0
21-Nov-86	863073	0.4	109	0
22-Nov-86	863074	0.2	52	0
23-Nov-86	863068	0.1	29	0
24-Nov-86	863066	0.1	24	0
25-Nov-86	863067	0.3	27	0
26-Nov-86	862981	0.2	35	0
27-Nov-86	862982	0.2	35	0
28-Nov-86	862980	0.2	43	0
29-Nov-86	863148	0.3	75	0
30-Nov-86	863147	0.2	57	0
01-Dec-86	863150	0.1	90	0
02-Dec-86	863196	0.1	61	0
03-Dec-86	863197	0.1	68	0
04-Dec-86	863195	0.2	109	0
05-Dec-86	863200	0.1	55	0
06-Dec-86	863192	0.1	32	0
07-Dec-86	863219	0	31	0
08-Dec-86	863236	0	21	0
09-Dec-86	863235	0	21	0
10-Dec-86	863228	0	23	0
11-Dec-86	863205	0.1	38	0
12-Dec-86	863204	0.1	91	0
13-Dec-86	863203	0.2	79	0
14-Dec-86	863213	0	22	0
15-Dec-86	863214	0.1	32	0
16-Dec-86	863207	0.1	90	0
17-Dec-86	863290	0.1	55	0
18-Dec-86	863291	0.1	79	0
19-Dec-86	863298	0.1	84	0
20-Dec-86	863323	0.2	74	0

21-Dec-86	863324	0.1	55	0
22-Dec-86	863339	0.1	16	0
23-Dec-86	863335	0.1	57	0
24-Dec-86	863329	0.3	115	0
25-Dec-86	863330	0.2	72	0
26-Dec-86	863375	0.1	79	0
27-Dec-86	863374	0.1	61	0
28-Dec-86	863369	0.1	63	0
29-Dec-86	863368	0.2	152	0
30-Dec-86	862689	0.3	123	0
31-Dec-86	863365	0.2	111	0
01-Jan-87	863366	0.1	60	0
02-Jan-87	862690	0.1	68	0
03-Jan-87	863423	*	*	5
04-Jan-87	863422	0.1	31	0
05-Jan-87	863421	0.1	38	0
06-Jan-87	863433	0.3	90	0
07-Jan-87	863459	0.1	38	0
08-Jan-87	863441	0	35	0
10-Jan-87	863448	0	25	0
11-Jan-87	863457	0.1	43	0
12-Jan-87	863447	0.2	119	0
13-Jan-87	863454	0.2	86	0
14-Jan-87	863453	0.1	29	0
15-Jan-87	863455	0.1	74	0
16-Jan-87	863430	0	12	0
17-Jan-87	863429	0	11	0
18-Jan-87	863428	0	24	0
19-Jan-87	863568	0.1	62	0
20-Jan-87	863569	0.1	45	0
21-Jan-87	863567	0.1	93	0
22-Jan-87	863578	0.1	82	0
23-Jan-87	863574	0.2	86	0
24-Jan-87	863575	0.1	74	0
25-Jan-87	863595	0.1	58	0
26-Jan-87	863596	0.1	96	0
27-Jan-87	863594	0.3	129	0
28-Jan-87	863586	0.2	67	0
29-Jan-87	863585	0.2	165	0
30-Jan-87	863587	0.2	158	0
31-Jan-87	863475	0.1	58	0
01-Feb-87	863474	0.1	53	0
02-Feb-87	863476	*	*	8
03-Feb-87	863469	0.1	87	0
04-Feb-87	863462	0.1	73	0
05-Feb-87	863468	0.1	59	0
06-Feb-87	870076	0	25	0
07-Feb-87	870077	0.1	51	0
08-Feb-87	870075	0.1	35	0
09-Feb-87	870240	0.1	56	0
10-Feb-87	870242	0.2	72	0
11-Feb-87	870241	0.4	67	0
12-Feb-87	870098	0.2	98	0
13-Feb-87	870097	0.3	102	0
14-Feb-87	870064	0.1	57	0
15-Feb-87	870087	0.1	48	
16-Feb-87	870086	0.1	28	0
17-Feb-87	870081	0.1	46	0
18-Feb-87	870137	0.1	57	0
19-Feb-87	870138	0.1	49	0
20-Feb-87	870136	0	65	0
21-Feb-87	870153	0	44	0
22-Feb-87	870154	0.1	55	0
23-Feb-87	870155	0.1	72	0
24-Feb-87	870163	0.3	27	0
25-Feb-87	870164	0	30	0
26-Feb-87	870000	*	*	8
27-Feb-87	870173	0.1	30	0
28-Feb-87	870170	0	52	0
01-Mar-87	870172	0.1	60	0
02-Mar-87	870165	0.2	137	0
03-Mar-87	870198	0.3	135	0
04-Mar-87	870197	0.4	134	0
05-Mar-87	870278	0.3	127	0
06-Mar-87	870279	0.2	132	0
07-Mar-87	870263	0.1	71	0
08-Mar-87	870281	0.1	76	0
09-Mar-87	870282	0.1	86	0
10-Mar-87	870206	0.1	92	0
11-Mar-87	870298	0.1	61	0
12-Mar-87	870296	0.2	148	0
13-Mar-87	870297	0.2	91	0
14-Mar-87	870273	0.4	76	0
15-Mar-87	870272	0.1	36	0
16-Mar-87	870260	0.1	44	0
17-Mar-87	870323	0.3	48	0
18-Mar-87	870324	0.2	105	0
19-Mar-87	870338	0.1	59	0
20-Mar-87	870331	0.1	56	0
21-Mar-87	870330	0.1	64	0
22-Mar-87	870332	0.1	63	0
23-Mar-87	870377	*	*	10
24-Mar-87	870376	0.1	47	0
25-Mar-87	870375	0.1	80	0
26-Mar-87	870369	0.1	36	0

27-Mar-87	870370	0.1	58	0
28-Mar-87	870371	0	43	0
29-Mar-87	870450	0	28	0
30-Mar-87	870449	0	38	0
31-Mar-87	870448	0.1	47	0
01-Apr-87	870465	0.5	70	0
02-Apr-87	870466	0.1	61	0
03-Apr-87	870464	0.2	65	0
04-Apr-87	870487	0.2	40	0
05-Apr-87	870498	*	*	5
06-Apr-87	870486	0.2	78	0
07-Apr-87	870473	0.2	96	0
08-Apr-87	870474	0.5	108	0
09-Apr-87	870472	0.2	111	0
10-Apr-87	870527	0.2	109	0
11-Apr-87	870526	0.2	68	0
12-Apr-87	870525	0.2	41	0
13-Apr-87	870534	0.2	118	0
14-Apr-87	870533	0.1	87	0
15-Apr-87	870535	0.2	97	0
16-Apr-87	870614	0.2	115	0
17-Apr-87	870613	0.2	146	0
18-Apr-87	870612	*	*	4
19-Apr-87	870580	0.1	40	0
20-Apr-87	870581	0.2	63	0
21-Apr-87	870608	0.1	48	0
22-Apr-87	870591	0.2	68	0
23-Apr-87	870596	0.2	106	0
24-Apr-87	870595	0.2	73	0
25-Apr-87	870643	0.2	84	0
26-Apr-87	870658	0.2	86	0
27-Apr-87	870642	0.4	170	0
28-Apr-87	870662	0.3	121	0
29-Apr-87	870663	0.3	105	0
30-Apr-87	870664	0.3	87	0
01-May-87	870676	0.2	76	0
02-May-87	870677	0.2	63	0
03-May-87	870675	0.1	47	0
04-May-87	870718	0.2	59	0
05-May-87	870708	0.3	80	0
06-May-87	870709	0.1	42	0
07-May-87	870707	0.1	60	0
08-May-87	870649	0.1	67	0
09-May-87	870648	0.1	75	0
10-May-87	870698	0.1	73	0
11-May-87	870699	0.2	69	0
12-May-87	870727	0.1	56	0
13-May-87	870726	0.1	56	0
14-May-87	870728	0.1	49	0
15-May-87	870763	0.1	69	0
16-May-87	870772	0.1	59	0
17-May-87	870770	0.1	44	0
18-May-87	870764	0.2	63	0
19-May-87	870835	0.2	57	0
20-May-87	870834	0.2	50	0
21-May-87	870836	0.1	55	0
22-May-87	870830	0.1	66	0
23-May-87	870829	0	46	0
24-May-87	870828	0.1	36	0
25-May-87	870843	0.1	37	0
26-May-87	870844	0.2	39	0
27-May-87	870842	0.5	42	0
28-May-87	870850	0.2	34	0
29-May-87	870851	0.1	37	0
30-May-87	870852	0.1	39	0
31-May-87	870880	0.1	40	0
08-Jun-87	870913	*	56	0
14-Jun-87	870980	*	66	0
20-Jun-87	870990	*	44	0
26-Jun-87	871031	*	47	0
02-Jul-87	871082	*	*	8
08-Jul-87	871106	0	29	0
14-Jul-87	871132	0.1	51	0
20-Jul-87	871138	0.1	74	0
26-Jul-87	871211	*	*	15
01-Aug-87	871181	0.1	58	0
07-Aug-87	871235	0.1	99	0
13-Aug-87	871248	0.1	101	0
19-Aug-87	871347	0.1	114	0
25-Aug-87	871382	0.1	57	0
31-Aug-87	871429	0.3	42	0
06-Sep-87	871492	0	67	0
12-Sep-87	871530	0.1	42	0
18-Sep-87	871553	0.1	31	0
24-Sep-87	871564	0.1	77	0
30-Sep-87	871577	0.1	85	0
06-Oct-87	871629	0.1	108	0
12-Oct-87	871662	0.1	80	0
18-Oct-87	871657	0.2	56	0
24-Oct-87	871710	0.1	33	0
30-Oct-87	871793	0.1	45	0
05-Nov-87	871803	0.1	56	0
11-Nov-87	871477	0.2	74	0
17-Nov-87	871833	0.2	63	0
23-Nov-87	871872	0.1	62	0
29-Nov-87	871913	0.1	50	0

05-Dec-87	871927	0.1	38	0
11-Dec-87	872001	0.1	99	0
17-Dec-87	872006	0.1	46	0
23-Dec-87	872068	0	25	0
29-Dec-87	872087	0.1	40	0
04-Jan-88	880001	0.1	49	0
10-Jan-88	880051	0.1	108	0
16-Jan-88	880030	0.1	33	0
22-Jan-88	880108	0.2	137	0
28-Jan-88	880183	0.7	122	0
03-Feb-88	871885	0	27	0
09-Feb-88	880090	0.1	63	0
15-Feb-88	880245	0.1	47	0
21-Feb-88	880302	0.3	62	0
27-Feb-88	880289	0.1	75	0
04-Mar-88	880308	0.1	46	0
10-Mar-88	880322	0.7	53	0
16-Mar-88	880159	0.1	46	0
22-Mar-88	880335	0.2	41	0
28-Mar-88	880438	0.1	49	0
03-Apr-88	880462	0.1	48	0
09-Apr-88	880476	0.1	83	0
15-Apr-88	880551	0.2	58	0
21-Apr-88	880600	0.2	52	0
27-Apr-88	880570	0.1	36	0
03-May-88	880689	0.1	89	0
09-May-88	880704	0.1	106	0
15-May-88	880726	0.1	41	0
21-May-88	880733	0.1	40	0
27-May-88	880783	0.2	60	0
02-Jun-88	880808	*	*	8
08-Jun-88	880821	0.3	84	0
14-Jun-88	880850	0.1	50	0
20-Jun-88	880867	0.5	63	0
26-Jun-88	880921	0.1	24	0
02-Jul-88	880933	0.1	66	0
08-Jul-88	880963	0.1	41	0
14-Jul-88	881001	0.2	52	0
20-Jul-88	881012	0	36	0
26-Jul-88	881046	0.2	89	0
01-Aug-88	881051	0.3	*	0
13-Aug-88	880173	0	*	0
19-Aug-88	881454	0.1	*	0
25-Aug-88	881449	0.1	*	0
31-Aug-88	881504	0.1	*	0
06-Sep-88	881507	0.2	*	0
12-Sep-88	881524	0.2	*	0
18-Sep-88	881528	0.6	*	0
24-Sep-88	881566	0.1	*	0
30-Sep-88	881572	0.1	*	0
06-Oct-88	881173	0.1	*	0
12-Oct-88	881664	0.1	*	0
18-Oct-88	881672	0.3	*	0
24-Oct-88	881701	0.4	*	0
30-Oct-88	881706	0	*	0
05-Nov-88	881745	0.1	*	0
11-Nov-88	881750	0	*	0
17-Nov-88	881756	0.1	*	0
23-Nov-88	881768	0.1	*	0
29-Nov-88	881774	0.2	*	0
04-Jan-89	880505	0	*	0
10-Jan-89	880530	0.1	*	0
16-Jan-89	881606	0.1	*	0
22-Jan-89	881614	0	*	0
28-Jan-89	890037	0.1	*	0
03-Feb-89	890106	0	*	0
09-Feb-89	890156	0.1	*	0
15-Feb-89	890153	0.1	*	0
21-Feb-89	890183	0.1	*	0
27-Feb-89	890198	0.1	*	0
05-Mar-89	890428	0	*	0
11-Mar-89	890431	0.1	*	0
17-Mar-89	890501	0.4	*	0
23-Mar-89	890511	0.1	*	0
29-Mar-89	890498	0.1	*	0
04-Apr-89	890491	0.1	*	0
10-Apr-89	890492	0	*	0
16-Apr-89	890597	0.1	*	0
22-Apr-89	890578	0.1	*	0
28-Apr-89	890572	0.1	*	0
04-May-89	890737	0.1	*	0
10-May-89	890740	0	*	0
16-May-89	890730	0	*	0
22-May-89	890775	0.2	*	0
28-May-89	890794	0.1	*	0
03-Jun-89	890822	0.1	*	0
09-Jun-89	890838	0.1	*	0
15-Jun-89	890886	0.1	*	0
21-Jun-89	890862	0.1	*	0
27-Jun-89	890866	0	*	0
03-Jul-89	891009	0.1	*	0
09-Jul-89	891029	0	*	0
15-Jul-89	891050	0	*	0
21-Jul-89	891337	0.1	*	0
27-Jul-89	891357	0.1	*	0

02-Aug-89	891070	0	*	0
08-Aug-89	891333	0	*	0
14-Aug-89	891352	0.4	*	0
20-Aug-89	891373	0.1	*	0
26-Aug-89	891405	0.1	*	0
01-Sep-89	891420	0.2	*	0
07-Sep-89	891455	0.2	*	0
13-Sep-89	890990	0.1	*	0
19-Sep-89	891101	0.1	*	0
25-Sep-89	891136	0.2	*	0
01-Oct-89	891121	0.1	*	0
07-Oct-89	891148	0	*	0
13-Oct-89	891166	0.1	*	0
19-Oct-89	891183	0.1	*	0
25-Oct-89	891194	0	*	0
31-Oct-89	891216	0.5	*	0
06-Nov-89	891222	0.2	*	0
12-Nov-89	891237	0.1	*	0
18-Nov-89	891240	0.2	*	0
24-Nov-89	891266	3.6	*	0
30-Nov-89	891284	0.4	*	0
06-Dec-89	891292	0.1	*	0
12-Dec-89	891706	0.1	*	0
18-Dec-89	891737	0.1	*	0
24-Dec-89	891758	0.1	*	0
30-Dec-89	891778	0	*	0
05-Jan-90	891782	0.2	*	0
11-Jan-90	891791	*	*	5
17-Jan-90	900008	0.1	*	0
23-Jan-90	900025	1.2	*	0
29-Jan-90	900045	0.1	*	0
04-Feb-90	900056	0.1	*	0
10-Feb-90	900073	*	*	8
16-Feb-90	900089	*	*	8
22-Feb-90	900307	*	*	8
28-Feb-90	900358	*	*	10
05-Apr-90	900451	0.3	*	0
11-Apr-90	900462	0.1	*	0
17-Apr-90	900784	0	*	0
23-Apr-90	900789	0.1	*	0
29-Apr-90	900704	0	*	0
05-May-90	900716	0	*	0
11-May-90	900725	0	*	0
17-May-90	900755	0.1	*	0
23-May-90	900778	0.1	*	0
29-May-90	900807	*	*	10
04-Jun-90	900824	0	*	0
06-Jun-90	900341	0.1	*	0
10-Jun-90	900843	0.1	*	0
12-Jun-90	900362	0.1	*	0
16-Jun-90	900853	0.1	*	0
18-Jun-90	900385	0.1	*	0
22-Jun-90	900881	0.1	*	0
24-Jun-90	900409	0.1	*	0
28-Jun-90	901281	0.1	*	0
30-Jun-90	900417	0.1	*	0
04-Jul-90	901106	0	*	0
10-Jul-90	901108	0.4	*	0
16-Jul-90	901128	0.8	*	0
22-Jul-90	901152	0.1	*	0
28-Jul-90	901157	0.1	*	0
03-Aug-90	901182	0.2	*	0
09-Aug-90	901189	0.1	*	0
15-Aug-90	901219	0.2	*	0
21-Aug-90	901221	0.2	*	0
27-Aug-90	901252	0.1	*	0
02-Sep-90	901266	0	*	0
08-Sep-90	901274	0.1	*	0
14-Sep-90	000000	*	*	8
20-Sep-90	000000	*	*	8
26-Sep-90	901501	0.1	*	0
02-Oct-90	901554	0.1	*	0
08-Oct-90	901574	0.1	*	0
14-Oct-90	901587	0.1	*	0
20-Oct-90	901599	0.1	*	0
26-Oct-90	901617	0.1	*	0
01-Nov-90	901631	0.1	*	0
07-Nov-90	901646	0.1	*	0
13-Nov-90	901659	0.2	*	0
19-Nov-90	901671	0.2	*	0
25-Nov-90	901661	0.1	*	0
01-Dec-90	901710	0	*	0
07-Dec-90	901706	0.3	*	0
13-Dec-90	901890	0.1	*	0
19-Dec-90	901908	0.1	*	0
25-Dec-90	901916	0.1	*	0
31-Dec-90	910112	0.1	*	0
06-Jan-91	910135	0	*	0
12-Jan-91	910142	0	*	0
18-Jan-91	910050	0	*	0
24-Jan-91	910063	0.1	*	0
30-Jan-91	910221	0	*	0
05-Feb-91	910239	0	*	0
11-Feb-91	910439	0.1	*	0

17-Feb-91	910262	0.1	*	0
23-Feb-91	000000	*	*	7
01-Mar-91	000000	*	*	7
07-Mar-91	910350	0.1	*	0
13-Mar-91	910368	0.1	*	0
19-Mar-91	910395	0.1	*	0
25-Mar-91	910678	0.1	*	0
31-Mar-91	910680	0.1	*	0
04-Apr-91	910987	0	*	0
06-Apr-91	910697	0.1	*	0
10-Apr-91	911000	0.1	*	0
12-Apr-91	910738	0.1	*	0
16-Apr-91	911017	0.1	*	0
18-Apr-91	910760	0.2	*	0
22-Apr-91	911042	0.1	*	0
24-Apr-91	910786	0.1	*	
28-Apr-91	911067	0.1	*	0
30-Apr-91	910809	0.1	*	0
06-May-91	910823	0.1	*	0
12-May-91	910837	0	*	0
18-May-91	910832	0	*	0
24-May-91	910850	*	*	8
30-May-91	910859	0.1	*	0
05-Jun-91	000000	*	*	8
11-Jun-91	910873	0.1	*	0
17-Jun-91	910891	0.1	*	0
23-Jun-91	910890	0.1	*	0
29-Jun-91	910926	0.1	*	0
05-Jul-91	910935	0.1	*	0
11-Jul-91	910950	0.2	*	0
17-Jul-91	910961	0.1	*	0
23-Jul-91	910972	0.1	*	0
29-Jul-91	910978	0	*	0
03-Sep-91	911138	0	*	0
09-Sep-91	911164	0.1	*	0
15-Sep-91	911194	0	*	0
21-Sep-91	911208	0	*	0
27-Sep-91	911279	0.1	*	0
03-Oct-91	911309	0.2	*	0
09-Oct-91	911340	0.1	*	0
15-Oct-91	911337	0	*	0
21-Oct-91	911394	0.1	*	0
27-Oct-91	911439	*	*	8

STATION 131061

3434 Bickers

AMBIENT AIR QUALITY SURVEILLANCE

SAMPLE DATE	FILTER NUMBER	LEAD ug/cum	PARTICULATES ug/cum	REMARK
17-Jan-82	811147	0.7	63	0
23-Jan-82	811234	0.5	70	0
29-Jan-82	811327	0.8	77	0
04-Feb-82	820019	0.3	63	0
10-Feb-82	811334	0.6	70	0
16-Feb-82	811336	0.7	92	0
22-Feb-82	820024	0.8	110	0
28-Feb-82	820033	0	90	0
06-Mar-82	820200	0.2	46	0
12-Mar-82	820240	0	0	14
18-Mar-82	820245	2.1	81	0
24-Mar-82	820222	0.4	52	0
30-Mar-82	820230	1	65	0
05-Apr-82	820273	0	0	1
11-Apr-82	820419	0.7	43	0
17-Apr-82	820413	0.2	53	0
23-Apr-82	820477	0.7	58	0
29-Apr-82	820460	0.8	70	0
05-May-82	820469	1.2	62	0
11-May-82	820253	0	0	14
17-May-82	820522	0	0	9
23-May-82	820501	0.4	54	0
29-May-82	820504	0.9	52	0
04-Jun-82	820508	0.2	50	0
10-Jun-82	820510	0.3	80	0
16-Jun-82	820552	0.2	44	0
22-Jun-82	820761	0.3	54	0
28-Jun-82	820768	0.3	67	0
04-Jul-82	820771	0.2	48	0
10-Jul-82	820722	1	81	0
16-Jul-82	820724	0.9	57	0
22-Jul-82	820726	0.8	100	0
28-Jul-82	820913	0.3	81	0
03-Aug-82	820912	0.7	71	0
09-Aug-82	820906	0.4	71	0
15-Aug-82	820901	0.3	54	0
21-Aug-82	820935	0.6	78	0
27-Aug-82	820936	0.4	75	0
02-Sep-82	820923	0	0	5
08-Sep-82	820815	0.3	94	0
14-Sep-82	000000	0	0	12
20-Sep-82	820995	0.2	52	0
26-Sep-82	820830	0.3	63	0
02-Oct-82	820827	0.4	72	0
08-Oct-82	820851	0.6	35	0
14-Oct-82	820884	1.1	89	0
20-Oct-82	820840	0.2	48	0
26-Oct-82	821021	0.7	72	0
01-Nov-82	821025	1.3	43	0
07-Nov-82	821034	0.3	33	0
13-Nov-82	821030	0.4	39	0
19-Nov-82	821077	0.7	39	0
25-Nov-82	821061	0.3	30	0
01-Dec-82	000000	0	0	10
07-Dec-82	000000	0	0	15
13-Dec-82	821068	0.4	37	0
19-Dec-82	821206	0.6	101	0
25-Dec-82	821298	0.1	34	0
31-Dec-82	821282	0.3	36	0
06-Jan-83	821288	0.9	73	0
12-Jan-83	830037	0.9	53	0
18-Jan-83	830034	0.3	47	0
24-Jan-83	830029	0	0	6
30-Jan-83	830079	0.3	33	0
05-Feb-83	830060	0.2	28	0
11-Feb-83	830067	0.6	53	0
17-Feb-83	830071	1.3	99	0
23-Feb-83	830258	0	0	6
01-Mar-83	830256	0	0	6
07-Mar-83	830251	0	0	6
13-Mar-83	830285	0.2	47	0
19-Mar-83	830090	0	0	6
25-Mar-83	830297	0.3	55	0
31-Mar-83	830339	0.4	62	0
06-Apr-83	830337	0	0	4
12-Apr-83	830328	0.2	66	0
18-Apr-83	830439	0.3	62	0
24-Apr-83	830144	0	0	5
30-Apr-83	830431	0.1	82	0
06-May-83	830392	0.6	79	0
12-May-83	830660	0.4	50	0
18-May-83	830673	0	0	6
24-May-83	830668	0.4	56	0
30-May-83	830174	0.2	41	0
05-Jun-83	830172	0.3	41	0
11-Jun-83	830501	0	0	4
17-Jun-83	830510	0.4	68	0

23-Jun-83	830536	0.3	63	0
29-Jun-83	830523	0.3	62	0
05-Jul-83	830879	0.4	46	0
11-Jul-83	830663	0.2	72	0
17-Jul-83	830561	0.1	64	0
23-Jul-83	830569	0.4	75	0
29-Jul-83	830574	0.2	75	0
04-Aug-83	830978	0.1	39	0
10-Aug-83	830970	0.2	49	0
16-Aug-83	831075	0.2	60	0
22-Aug-83	831063	0.3	38	0
28-Aug-83	831196	0.2	56	0
03-Sep-83	831181	0.7	94	0
09-Sep-83	831181	0.2	41	0
15-Sep-83	831274	0.3	85	0
21-Sep-83	831261	0.3	45	0
27-Sep-83	831379	0.4	79	0
03-Oct-83	831373	0.2	76	0
09-Oct-83	831439	0.5	78	0
15-Oct-83	831431	0.2	52	0
21-Oct-83	831426	0.1	13	0
27-Oct-83	831487	0.9	77	0
02-Nov-83	831614	0.2	44	0
08-Nov-83	831600	0.2	39	0
14-Nov-83	831608	0.3	63	0
20-Nov-83	831668	0.2	35	0
26-Nov-83	831675	0.1	26	0
02-Dec-83	831777	0.5	36	0
08-Dec-83	831789	0	0	8
14-Dec-83	831848	0.4	54	0
20-Dec-83	831649	0.2	59	0
26-Dec-83	831870	0.2	31	0
01-Jan-84	831919	0	0	4
07-Jan-84	831907	1.3	89	0
13-Jan-84	840002	0.1	52	0
19-Jan-84	840010	0.2	45	0
25-Jan-84	840079	0.9	106	0
31-Jan-84	840070	0.7	67	0
06-Feb-84	840119	0	0	8
12-Feb-84	840260	0.4	46	0
18-Feb-84	840144	0	0	2
24-Feb-84	840300	0.4	74	0
01-Mar-84	840363	0	0	6
07-Mar-84	840312	0	0	6
13-Mar-84	840457	0.3	48	0
19-Mar-84	840492	0.1	73	0
25-Mar-84	840534	0.3	46	0
31-Mar-84	840588	0.2	66	0
06-Apr-84	840638	0.2	58	0
12-Apr-84	840637	0.3	64	0
18-Apr-84	840765	0.3	69	0
24-Apr-84	840685	0.3	97	0
30-Apr-84	840685	0	0	8
06-May-84	840698	0	0	9
12-May-84	840967	0.3	49	0
18-May-84	840981	0.2	76	0
24-May-84	841103	0.1	57	0
30-May-84	841110	0.4	64	0
05-Jun-84	841220	0.2	42	0
11-Jun-84	841234	0.2	48	0
17-Jun-84	841290	0.1	37	0
23-Jun-84	841284	0.2	58	0
29-Jun-84	841285	0	0	18
05-Jul-84	841519	0	0	18
11-Jul-84	841510	0.2	99	0
17-Jul-84	841500	0.2	87	0
23-Jul-84	841530	0.2	104	0
29-Jul-84	841640	0.1	61	0
04-Aug-84	841650	0.2	82	0
10-Aug-84	841710	0.3	76	0
16-Aug-84	841756	0.3	92	0
22-Aug-84	841845	0.2	65	0
28-Aug-84	841659	0.3	105	0
03-Sep-84	841932	0.1	44	0
09-Sep-84	841922	0.1	54	0
15-Sep-84	842016	0.1	59	0
21-Sep-84	842012	0.3	118	0
27-Sep-84	842137	0.1	42	0
03-Oct-84	842125	0.3	73	0
09-Oct-84	000000	0	0	18
15-Oct-84	000000	0	0	18
21-Oct-84	000000	0	0	18
27-Oct-84	842260	0	0	18
02-Nov-84	842391	0.2	35	0
08-Nov-84	842510	0.1	72	0
14-Nov-84	842509	0.2	63	0
20-Nov-84	842569	0.3	45	0
26-Nov-84	842679	0.4	39	0
02-Dec-84	842594	0.1	44	0
08-Dec-84	842780	0.4	64	0
14-Dec-84	842670	0.2	24	0
20-Dec-84	842580	0.3	29	0
26-Dec-84	842959	0	0	5
01-Jan-85	842959	0	0	5

07-Jan-85	842963	0.5	79	0
13-Jan-85	850000	0	0	18
19-Jan-85	850009	0.5	111	0
25-Jan-85	850078	0	0	4
31-Jan-85	850139	0.1	45	0
06-Feb-85	850220	0.2	83	0
12-Feb-85	850266	0.5	100	0
18-Feb-85	850289	0.2	73	0
24-Feb-85	850360	0.2	33	0
02-Mar-85	850371	0.2	51	0
08-Mar-85	850479	0.2	63	0
14-Mar-85	850389	0.2	41	0
20-Mar-85	850381	0.1	34	0
26-Mar-85	850408	0.2	70	0
01-Apr-85	850404	0.1	89	0
07-Apr-85	850400	0.1	49	0
13-Apr-85	850725	0.2	37	0
19-Apr-85	850647	0.2	41	0
25-Apr-85	850822	0.2	56	0
01-May-85	850831	0.3	69	0
07-May-85	850961	0.3	53	0
13-May-85	850967	0.2	38	0
19-May-85	850970	0	0	4
25-May-85	851088	0.1	66	0
31-May-85	851089	0.2	90	0
06-Jun-85	851230	0.1	39	0
12-Jun-85	851244	0.2	43	0
18-Jun-85	851287	0.1	44	0
24-Jun-85	851286	0.1	53	0
30-Jun-85	851379	0.1	47	0
06-Jul-85	851453	0.1	69	0
12-Jul-85	851566	0	108	0
18-Jul-85	851594	0	99	0
24-Jul-85	851627	0.2	90	0
30-Jul-85	851667	0.1	97	0
05-Aug-85	851522	0.1	72	0
11-Aug-85	850855	0.1	74	0
17-Aug-85	851739	0.1	56	0
23-Aug-85	851538	0.2	74	0
29-Aug-85	851542	0.2	135	0
04-Sep-85	851736	0.1	110	0
10-Sep-85	851745	0.1	58	0
16-Sep-85	852120	0	0	3
22-Sep-85	852133	0.1	52	0
28-Sep-85	852184	0.1	49	0
04-Oct-85	851449	0.1	96	0
10-Oct-85	852274	0.1	34	0
16-Oct-85	852400	0.3	60	0
22-Oct-85	862412	0.2	50	0
28-Oct-85	852530	0	43	0
03-Nov-85	852453	0.2	64	0
09-Nov-85	852624	0	62	0
15-Nov-85	852720	0	0	15
21-Nov-85	852637	0.2	61	0
27-Nov-85	852787	0.1	15	0
03-Dec-85	852854	0.1	40	0
09-Dec-85	852814	0.1	36	0
15-Dec-85	852980	0.1	36	0
21-Dec-85	853023	0.3	77	0
27-Dec-85	853100	0.3	60	0
02-Jan-86	860001	0	0	10
08-Jan-86	860023	0.1	40	0
14-Jan-86	860099	0.3	124	0
20-Jan-86	860177	0.2	96	0
26-Jan-86	860219	0.1	37	0
01-Feb-86	860208	0.1	44	0
07-Feb-86	853143	0.1	26	0
13-Feb-86	860260	0.1	49	0
19-Feb-86	860289	0.2	113	0
25-Feb-86	860459	0.2	124	0
03-Mar-86	860460	0.2	106	0
09-Mar-86	860599	0.2	109	0
15-Mar-86	860581	0	0	8
21-Mar-86	860740	0	0	6
27-Mar-86	860657	0	0	6
02-Apr-86	860787	0.2	69	0
08-Apr-86	860836	0	73	0
14-Apr-86	860826	0	0	6
20-Apr-86	860912	0.1	37	0
26-Apr-86	860964	0.1	55	0
02-May-86	860976	0.1	53	0
08-May-86	861091	0.1	61	0
14-May-86	861184	0.1	84	0
20-May-86	861240	0.1	73	0
26-May-86	861247	0.1	87	0
01-Jun-86	861258	0.1	32	0
07-Jun-86	861354	0.1	45	0
13-Jun-86	861386	0.1	69	0
19-Jun-86	861498	0.2	90	0
25-Jun-86	861549	0.2	99	0
01-Jul-86	861669	0.1	98	0
07-Jul-86	861613	0.1	105	0
13-Jul-86	861800	0.1	81	0
19-Jul-86	861812	0.1	78	0
25-Jul-86	861846	0.1	74	0

31-Jul-86	862019	0.1	87	0
06-Aug-86	862006	0.2	60	0
12-Aug-86	862073	0.1	51	0
18-Aug-86	862061	0.1	95	0
24-Aug-86	862132	0.1	35	0
30-Aug-86	862216	0.1	60	0
05-Sep-86	862307	0.1	41	0
11-Sep-86	862380	0.1	59	0
17-Sep-86	862417	0.1	64	0
23-Sep-86	862102	0.1	51	0
29-Sep-86	862517	0.1	54	0
05-Oct-86	862546	0.1	45	0
11-Oct-86	862665	0.1	32	0
17-Oct-86	862675	0.2	97	0
23-Oct-86	862747	0.1	21	0
29-Oct-86	862811	0.3	101	0
04-Nov-86	862832	0.1	30	0
10-Nov-86	862870	0.2	27	0
16-Nov-86	862894	0.1	47	0
22-Nov-86	862962	0.2	42	0
28-Nov-86	863045	0.2	51	0
04-Dec-86	863087	0.2	80	0
10-Dec-86	863171	0.1	31	0
16-Dec-86	863261	0.1	71	0
22-Dec-86	863303	0.1	38	0
28-Dec-86	863351	0.1	83	0
03-Jan-87	863391	0	21	0
09-Jan-87	863409	0	21	0
15-Jan-87	863515	0.1	50	0
21-Jan-87	863529	0.1	64	0
27-Jan-87	863547	0.2	114	0
02-Feb-87	870013	0.1	86	0
08-Feb-87	870054	0.1	37	0
14-Feb-87	870029	0	52	0
20-Feb-87	870100	0	30	0
26-Feb-87	870112	0.1	17	0
04-Mar-87	870224	0.3	155	0
10-Mar-87	870202	0.1	40	0
16-Mar-87	870309	0.1	52	0
22-Mar-87	870345	0.1	72	0
28-Mar-87	870356	0	44	0
03-Apr-87	870432	0.2	53	0
09-Apr-87	870494	0.2	64	0
15-Apr-87	870511	0.2	75	0
21-Apr-87	870629	0.1	41	0
27-Apr-87	870237	0.2	65	0
03-May-87	870681	0.1	51	0
09-May-87	870693	0.1	64	0
15-May-87	870602	0.1	55	0
21-May-87	870614	0.2	57	0
27-May-87	870868	0.1	49	00
02-Jun-87	870877	0	35	0
08-Jun-87	870910	0	47	0
14-Jun-87	870927	0	49	0
20-Jun-87	870987	0	39	0
26-Jun-87	871026	0.1	54	0
02-Jul-87	871066	0.1	56	0
08-Jul-87	871103	0	37	0
14-Jul-87	871129	0.1	46	0
20-Jul-87	871135	0	0	9
26-Jul-87	871205	0	53	0
01-Aug-87	871219	0	50	0
07-Aug-87	871227	0.2	87	0
13-Aug-87	871241	0.1	100	0
19-Aug-87	871343	0.1	107	0
25-Aug-87	871381	0	62	0
31-Aug-87	871427	0	42	0
06-Sep-87	871489	0	61	0
12-Sep-87	871526	0.1	46	0
18-Sep-87	871546	0	26	0
24-Sep-87	871565	0.3	63	0
30-Sep-87	871578	0	58	0
06-Oct-87	871630	0.1	81	0
12-Oct-87	871637	0.1	77	0
18-Oct-87	871637	0.1	53	0
24-Oct-87	871711	0.1	30	0
30-Oct-87	871786	0.1	56	0
05-Nov-87	871800	0.1	52	0
11-Nov-87	871744	0.1	75	0
17-Nov-87	871744	0.1	48	0
23-Nov-87	871869	0	52	0
29-Nov-87	871911	0.1	37	0
05-Dec-87	871924	0.1	40	0
11-Dec-87	871938	0.1	71	0
17-Dec-87	872006	0.1	46	0
23-Dec-87	872062	0.1	26	0
29-Dec-87	870286	0.1	40	0
04-Jan-88	872094	0.1	52	0
10-Jan-88	880052	0.1	88	0
16-Jan-88	880029	0	32	0
22-Jan-88	880106	0.1	83	0
28-Jan-88	880117	0.1	87	0
03-Feb-88	871886	0	34	0
09-Feb-88	871993	0.1	78	0

15-Feb-88	880247	0	47	0
21-Feb-88	880256	0.1	56	0
27-Feb-88	880290	0.1	67	0
04-Mar-88	880309	0.2	51	0
10-Mar-88	880323	0.6	77	0
16-Mar-88	880200	0.1	54	0
22-Mar-88	880332	0.2	48	0
28-Mar-88	880427	0.2	63	0
03-Apr-88	880483	0.1	48	0
09-Apr-88	880477	0	66	0
15-Apr-88	880547	0.1	32	0
21-Apr-88	880559	0.6	62	0
27-Apr-88	880571	0	36	0
03-May-88	880681	0.1	59	0
09-May-88	880702	0	93	0
15-May-88	880725	0.1	42	0
21-May-88	880728	0.1	31	0
27-May-88	880770	0.1	63	0
02-Jun-88	880609	0.1	35	0
08-Jun-88	880622	0.1	69	0
14-Jun-88	880647	0	51	0
20-Jun-88	880866	0.1	55	0
26-Jun-88	880920	0.1	22	0
02-Jul-88	880931	0.1	58	0
08-Jul-88	880964	0	0	4
14-Jul-88	881000	0.1	52	0
20-Jul-88	881011	0.1	41	0
26-Jul-88	881045	0.1	65	0
01-Aug-88	881052	0.1	0	0
07-Aug-88	881130	0.1	0	0
13-Aug-88	880174	0	0	0
19-Aug-88	881453	0.1	0	0
25-Aug-88	881446	0.1	0	0
31-Aug-88	881505	0.1	0	0
06-Sep-88	881508	0.1	0	0
12-Sep-88	881523	0.1	0	0
18-Sep-88	881529	0.1	0	0
24-Sep-88	881567	0.1	0	0
30-Sep-88	881573	0.1	0	0
06-Oct-88	881578	0.1	0	0
12-Oct-88	881665	0.1	0	0
18-Oct-88	881673	0	0	0
24-Oct-88	881719	0.2	0	0
30-Oct-88	881707	0	0	0
05-Nov-88	881744	0.1	0	0
11-Nov-88	881751	0	0	0
17-Nov-88	881757	0.1	0	0
23-Nov-88	881769	0.1	0	0
29-Nov-88	881775	0.1	0	0
04-Jan-89	890506	0.1	0	0
10-Jan-89	880949	0.1	0	0
16-Jan-89	881604	0.1	0	0
22-Jan-89	890029	0.1	0	0
28-Jan-89	890038	0.1	0	0
03-Feb-89	890107	0	0	0
09-Feb-89	890149	0.1	0	0
15-Feb-89	890154	0	0	0
21-Feb-89	890182	0	0	0
27-Feb-89	890199	0	0	0
05-Mar-89	890427	0	0	0
11-Mar-89	890430	0.3	0	0
17-Mar-89	890518	0.1	0	0
23-Mar-89	890510	0.1	0	0
29-Mar-89	890499	0.1	0	0
04-May-89	890736	0.1	0	0
10-May-89	890744	0	0	0
16-May-89	890729	0	0	0
22-May-89	890773	0.1	0	0
28-May-89	890787	0.1	0	0
03-Jun-89	890823	0.1	0	0
09-Jun-89	890817	0.1	0	0
15-Jun-89	890894	0	0	0
21-Jun-89	890861	0.1	0	0
27-Jun-89	890867	0	0	0
03-Jul-89	891010	0	0	0
09-Jul-89	891030	0	0	0
15-Jul-89	891049	0	0	0
21-Jul-89	891338	0.1	0	0
27-Jul-89	891079	0.1	0	0
02-Aug-89	891071	0.1	0	0
08-Aug-89	891332	0	0	0
14-Aug-89	891353	0.1	0	0
20-Aug-89	891374	0.1	0	0
26-Aug-89	891404	0	0	0
01-Sep-89	891421	0.1	0	0
07-Sep-89	891446	0	0	0
13-Sep-89	890988	0	0	0
19-Sep-89	891103	0.1	0	0
25-Sep-89	891134	0.1	0	0
01-Oct-89	891123	0	0	0
07-Oct-89	891143	0	0	0
13-Oct-89	891174	0.1	0	0
19-Oct-89	891165	0.1	0	0
25-Oct-89	891195	0	0	0
31-Oct-89	891212	0	0	0

06-Nov-89	891224	0	0	0
12-Nov-89	891236	0.1	0	0
18-Nov-89	891242	0.1	0	0
24-Nov-89	891267	0.1	0	0
30-Nov-89	891283	0	0	0
06-Dec-89	891702	0.1	0	0
12-Dec-89	891716	0	0	0
18-Dec-89	891724	0.1	0	0
24-Dec-89	891722	0.1	0	0
30-Dec-89	891743	0	0	0
05-Jan-90	891744	0.1	0	0
11-Jan-90	891792	0.1	0	0
17-Jan-90	900010	0.1	0	0
23-Jan-90	900026	0.1	0	0
29-Jan-90	900046	0	0	0
04-Feb-90	900042	0.1	0	0
10-Feb-90	900062	0	0	0
16-Feb-90	900085	0	0	0
22-Feb-90	900309	0	0	0
28-Feb-90	900339	0	0	0
06-Mar-90	900340	0	0	0
12-Mar-90	900369	0	0	0
18-Mar-90	900384	0.1	0	0
24-Mar-90	900403	0	0	0
30-Mar-90	900427	0.1	0	0
05-Apr-90	900431	0.1	0	0
11-Apr-90	900461	0	0	0
17-Apr-90	900760	0	0	0
23-Apr-90	900464	0	0	0
29-Apr-90	900702	0	0	0
05-May-90	900737	0	0	0
11-May-90	900723	0.1	0	0
17-May-90	900745	0.1	0	0
23-May-90	900770	0.1	0	0
29-May-90	900802	0	0	0
04-Jun-90	900820	0	0	0
10-Jun-90	900850	0	0	0
16-Jun-90	900881	0	0	0
22-Jun-90	900883	0	0	0
28-Jun-90	901282	0	0	0
04-Jul-90	901105	0	0	0
10-Jul-90	901114	0	0	0
16-Jul-90	901130	0.1	0	0
22-Jul-90	901153	0	0	0
28-Jul-90	901156	0	0	0
03-Aug-90	901173	0.1	0	0
09-Aug-90	901196	0	0	0
15-Aug-90	901216	0.1	0	0
21-Aug-90	901226	0.1	0	0
27-Aug-90	901223	0	0	0
02-Sep-90	901264	0	0	0
08-Sep-90	901272	0	0	0
14-Sep-90	901516	0	0	0
20-Sep-90	901518	0	0	0
26-Sep-90	901545	0	0	0
02-Oct-90	901550	0.1	0	0
08-Oct-90	901573	0.1	0	0
14-Oct-90	901590	0	0	0
20-Oct-90	901602	0.1	0	0
26-Oct-90	901608	0.1	0	0
01-Nov-90	901636	0.1	0	0
07-Nov-90	901647	0.1	0	0
13-Nov-90	901656	0.1	0	0
19-Nov-90	000000	0	0	12
25-Nov-90	901672	0	0	0
01-Dec-90	901714	0	0	12
07-Dec-90	901704	0.1	0	0
13-Dec-90	901884	0	0	12
19-Dec-90	901909	0	0	12
25-Dec-90	901914	0	0	12
31-Dec-90	910121	0.1	0	0
06-Jan-91	910134	0	0	0
12-Jan-91	910144	0	0	0
18-Jan-91	910061	0	0	12
24-Jan-91	910079	0	0	0
30-Jan-91	910220	0	0	0
05-Feb-91	910236	0	0	0
11-Feb-91	910436	0.1	0	0
17-Feb-91	910264	0	0	0
23-Feb-91	910263	0.1	0	0
01-Mar-91	910319	0	0	0
07-Mar-91	910348	0	0	0
13-Mar-91	910364	0.1	0	0
19-Mar-91	910347	0.1	0	0
25-Mar-91	910677	0.1	0	0
31-Mar-91	910675	0	0	0
06-Apr-91	910695	0.1	0	0
12-Apr-91	910737	0	0	0
18-Apr-91	910762	0.2	0	0
24-Apr-91	910769	0.1	0	0
30-Apr-91	910806	0.1	0	0
06-May-91	910826	0	0	0
12-May-91	910835	0	0	0
18-May-91	910841	0.1	0	0

24-May-91	910851	0.1	0	0
30-May-91	910860	0.1	0	0
05-Jul-91	910936	0	0	8
11-Jul-91	000000	0	0	12
17-Jul-91	000000	0	0	12
23-Jul-91	910949	0	0	0
29-Jul-91	910977	0	0	0
04-Aug-91	910985	0	0	0
10-Aug-91	911019	0.1	0	0
16-Aug-91	911018	0	0	0
22-Aug-91	911056	0	0	0
28-Aug-91	911066	0	0	0
03-Sep-91	911131	0	0	0
09-Sep-91	911166	0.1	0	0
15-Sep-91	911190	0	0	0
21-Sep-91	911212	0	0	0
27-Sep-91	911278	0	0	0
03-Oct-91	911303	0	0	0
09-Oct-91	911342	0.1	0	0
15-Oct-91	911370	0	0	0
21-Oct-91	911392	0	0	0
27-Oct-91	911420	0.1	0	0

STATION 131067

3417 Toronto
AMBIENT AIR QUALITY SURVEILLANCE

SAMPLE DATE	FILTER NUMBER	LEAD ug/cum	PARTICULATES ug/cum	REMARKS
01-Feb-84	840159	1.2	73	0
02-Feb-84	840158	1.1	74	0
04-Feb-84	840201	0.6	57	0
05-Feb-84	840200	0.1	55	0
07-Feb-84	840143	0.6	60	0
08-Feb-84	840154	0.9	49	0
10-Feb-84	840245	0.4	52	0
11-Feb-84	840246	0.5	34	0
13-Feb-84	840280	1	80	0
14-Feb-84	840229	0.8	86	0
16-Feb-84	840291	1.6	84	0
17-Feb-84	840281	1	81	0
19-Feb-84	840270	0.1	20	0
20-Feb-84	840271	0.2	28	0
22-Feb-84	840331	1.1	96	0
23-Feb-84	840379	0.4	78	0
25-Feb-84	840369	0.6	73	0
26-Feb-84	840368	0.2	33	0
28-Feb-84	840416	0.5	51	0
29-Feb-84	840419	0.1	19	0
02-Mar-84	840394	0.3	50	0
03-Mar-84	840395	0.3	60	0
05-Mar-84	840386	0.1	16	0
06-Mar-84	840387	0.4	35	0
08-Mar-84	840428	0.2	51	0
09-Mar-84	840427	0.3	56	0
11-Mar-84	840495	0.2	43	0
12-Mar-84	840528	0.2	28	0
14-Mar-84	840523	0.4	49	0
15-Mar-84	840531	0.4	34	0
17-Mar-84	840547	0.2	37	0
20-Mar-84	840573	0.1	28	0
21-Mar-84	840572	0.5	61	0
23-Mar-84	840487	0.2	26	0
24-Mar-84	840486	0.2	28	0
26-Mar-84	840659	0.3	82	0
27-Mar-84	840658	0.3	104	0
29-Mar-84	840590	0.2	37	0
01-Apr-84	840678	0.4	52	0
02-Apr-84	840711	0.5	100	0
04-Apr-84	840665	0.1	40	0
05-Apr-84	840666	0.7	63	0
07-Apr-84	840739	0.2	35	0
08-Apr-84	840731	0.1	38	0
10-Apr-84	840726	0.4	139	0
11-Apr-84	840725	0.5	82	0
13-Apr-84	840784	0.4	75	0
14-Apr-84	840783	0.1	71	0
16-Apr-84	840857	0.2	46	0
17-Apr-84	840856	0.4	70	0
19-Apr-84	840877	0.2	74	0
20-Apr-84	840876	0.6	224	0
22-Apr-84	840716	0.1	37	0
23-Apr-84	840715	0.4	58	0
01-May-84	840926	0.3	60	0
02-May-84	840927	0.3	91	0
04-May-84	840995	0.4	71	0
07-May-84	840945	0.3	80	0
08-May-84	840994	0.1	83	0
10-May-84	841031	0.6	99	0
11-May-84	841030	0.6	72	0
13-May-84	841044	0.3	52	0
14-May-84	841052	0.6	62	0
16-May-84	841136	0.3	85	0
17-May-84	841135	0.4	93	0
19-May-84	841159	1.1	28	0
20-May-84	841158	0.1	28	0
22-May-84	841149	0.4	56	0
23-May-84	841148	0.2	55	0
25-May-84	841056	0.3	84	0
26-May-84	841057	0.2	48	0
31-May-84	841189	0.5	71	0
01-Jun-84	841190	0.4	65	0
03-Jun-84	841240	0.2	47	0
04-Jun-84	841259	0.5	53	0
06-Jun-84	841215	0.3	26	0
07-Jun-84	841214	0.6	54	0
09-Jun-84	841203	0.2	44	0
10-Jun-84	841319	0.1	37	0
12-Jun-84	841307	0.3	59	0
15-Jun-84	841301	0.6	64	0
18-Jun-84	841344	0.3	58	0
19-Jun-84	841359	0.3	66	0
27-Jun-84	841381	0.4	78	0

28-Jun-84	841374	0.9	58	0
30-Jun-84	841461	0.2	43	0
01-Jul-84	841462	0.2	58	0
03-Jul-84	841495	0.4	83	0
04-Jul-84	841494	0.2	64	0
06-Jul-84	841480	0.3	67	0
07-Jul-84	841481	0.1	53	0
09-Jul-84	841546	0.3	62	0
10-Jul-84	841547	0.5	71	0
12-Jul-84	841467	0.4	110	0
13-Jul-84	841468	0.3	81	0
16-Jul-84	841578	0.4	66	0
18-Jul-84	841564	0.2	69	0
19-Jul-84	841563	0.2	75	0
21-Jul-84	841616	0.4	65	0
22-Jul-84	841617	0.2	19	0
24-Jul-84	841637	0.4	80	0
25-Jul-84	841636	0.4	69	0
27-Jul-84	841624	0.2	65	0
28-Jul-84	841623	0.4	56	0
30-Jul-84	841694	0.3	68	0
31-Jul-84	841693	0.4	113	0
02-Aug-84	841738	0.3	102	0
03-Aug-84	841739	0.3	86	0
05-Aug-84	841740	0.1	65	0
06-Aug-84	841741	0.3	60	0
08-Aug-84	841718	0.3	92	0
09-Aug-84	841717	0.4	68	0
11-Aug-84	841702	0.3	46	0
12-Aug-84	841704	0.3	35	0
14-Aug-84	841810	0.5	82	0
15-Aug-84	841809	0.4	60	0
17-Aug-84	841801	0.4	121	0
18-Aug-84	841879	0.3	86	0
20-Aug-84	841870	0.2	101	0
21-Aug-84	841869	0.3	74	0
23-Aug-84	841897	0.5	83	0
24-Aug-84	841896	0.2	73	0
26-Aug-84	841966	0.2	72	0
27-Aug-84	841967	0.4	126	0
29-Aug-84	841974	0.3	118	0
30-Aug-84	841824	0.3	118	0
01-Sep-84	841884	0.7	105	0
02-Sep-84	841885	0.1	39	0
04-Sep-84	842059	0.3	49	0
05-Sep-84	842058	0.6	110	0
07-Sep-84	841995	0.4	97	0
08-Sep-84	841994	0.2	73	0
10-Sep-84	842068	0.3	65	0
11-Sep-84	842067	0.4	65	0
13-Sep-84	842060	0.4	103	0
14-Sep-84	842099	0.4	96	0
16-Sep-84	842082	0.1	37	0
17-Sep-84	842083	0.2	59	0
19-Sep-84	842115	0.3	90	0
20-Sep-84	842114	0.4	126	0
22-Sep-84	842175	0.2	35	0
23-Sep-84	842174	0.2	40	0
25-Sep-84	842161	0.3	74	0
26-Sep-84	842160	0.1	16	0
28-Sep-84	842188	0.1	25	0
29-Sep-84	842189	0.1	26	0
01-Oct-84	842233	0.6	*	0
02-Oct-84	842232	0.4	*	0
04-Oct-84	842254	0.4	*	0
05-Oct-84	842131	0.3	*	0
07-Oct-84	842247	0.2	*	0
08-Oct-84	842246	0.7	*	0
10-Oct-84	842209	0.4	*	0
11-Oct-84	842202	0.4	*	0
13-Oct-84	842313	0.2	*	0
14-Oct-84	842314	0.2	*	0
16-Oct-84	842379	0.1	*	0
17-Oct-84	842378	0.3	*	0
19-Oct-84	842367	0.3	*	0
20-Oct-84	842361	0.4	*	0
22-Oct-84	842443	0.1	*	0
23-Oct-84	842442	0.1	*	0
25-Oct-84	842414	0.1	*	0
26-Oct-84	842402	0.4	*	0
28-Oct-84	842455	0.2	*	0
29-Oct-84	842454	0.6	*	0
31-Oct-84	842470	0.3	*	0
01-Nov-84	842469	0.1	27	0
03-Nov-84	842522	0.2	39	0
04-Nov-84	842523	0.2	52	0
06-Nov-84	842535	0.8	103	0
07-Nov-84	842534	0.5	72	0
09-Nov-84	842547	0.3	95	0
10-Nov-84	842546	0.2	78	0
12-Nov-84	842602	0.5	56	0
13-Nov-84	842603	0.6	70	0
15-Nov-84	842618	0.2	59	0
16-Nov-84	842617	0.2	45	0
18-Nov-84	842294	0.1	7	0
19-Nov-84	842293	0.1	25	0

21-Nov-84	842698	0.9	99	0
22-Nov-84	842697	0.7	61	0
24-Nov-84	842689	0.4	54	0
25-Nov-84	842688	*	*	18
27-Nov-84	842732	0.1	27	0
28-Nov-84	842731	0.5	68	0
30-Nov-84	842755	0.8	94	0
01-Dec-84	842740	0.5	13	0
03-Dec-84	842741	0.2	45	0
04-Dec-84	842740	0.1	13	0
06-Dec-84	842769	0.3	48	0
07-Dec-84	842770	0.4	64	0
09-Dec-84	842785	0.4	61	0
10-Dec-84	842782	1.1	124	0
12-Dec-84	842862	0.3	66	0
13-Dec-84	842863	0.2	33	0
15-Dec-84	842865	0.2	30	0
16-Dec-84	842864	0.3	25	0
18-Dec-84	842844	0.2	26	0
19-Dec-84	842843	0.5	55	0
21-Dec-84	842892	0.4	63	0
22-Dec-84	842891	0.6	63	0
24-Dec-84	842663	0.1	43	0
25-Dec-84	842664	0.1	30	0
27-Dec-84	842825	0.3	54	0
28-Dec-84	842824	2.4	43	0
30-Dec-84	842910	0.1	16	0
31-Dec-84	842911	0.1	10	0
02-Jan-85	842984	0.1	16	0
03-Jan-85	842985	0.2	51	0
05-Jan-85	842948	0.5	72	0
06-Jan-85	842949	0.5	59	0
08-Jan-85	842953	0.8	124	0
09-Jan-85	842952	0.3	64	0
11-Jan-85	840893	0.1	39	0
12-Jan-85	840892	0.1	34	0
14-Jan-85	840885	0.3	64	0
15-Jan-85	840884	0.5	61	0
17-Jan-85	850048	0.2	48	0
18-Jan-85	850047	0.7	101	0
20-Jan-85	850102	0	44	0
21-Jan-85	850103	*	*	15
23-Jan-85	850154	*	*	5
24-Jan-85	850155	0.3	107	0
26-Jan-85	850141	*	*	5
27-Jan-85	850140	0.1	22	0
29-Jan-85	850064	0.4	62	0
30-Jan-85	850063	0.1	40	0
01-Feb-85	850168	0.1	20	0
02-Feb-85	850169	0.2	55	0
04-Feb-85	850123	0.2	59	0
05-Feb-85	850125	0.1	39	0
07-Feb-85	850273	0.3	87	0
08-Feb-85	850272	*	*	3
10-Feb-85	850265	0.1	42	0
11-Feb-85	850264	0.1	37	0
13-Feb-85	850314	0.4	96	0
14-Feb-85	850312	0.3	55	0
16-Feb-85	850359	0.4	83	0
17-Feb-85	850358	0.2	65	0
19-Feb-85	850345	0.4	82	0
20-Feb-85	850344	0.4	82	0
22-Feb-85	850458	*	*	18
23-Feb-85	000000	*	*	18
25-Feb-85	850202	0.4	54	0
26-Feb-85	850457	0.2	59	0
28-Feb-85	850444	0.5	60	0
01-Mar-85	850443	0.1	52	0
03-Mar-85	850467	2.7	58	0
04-Mar-85	850466	0.1	61	0
06-Mar-85	850430	0.2	49	0
07-Mar-85	850429	0.2	67	0
09-Mar-85	850514	0.5	67	0
10-Mar-85	850513	0.1	66	0
12-Mar-85	850500	0.1	61	0
13-Mar-85	850559	0.3	40	0
15-Mar-85	850546	0.2	43	0
16-Mar-85	850545	0.1	43	0
18-Mar-85	850571	0.5	97	0
19-Mar-85	850570	0.3	55	0
21-Mar-85	850195	0.1	22	0
22-Mar-85	850194	0.2	61	0
24-Mar-85	850586	0.3	72	0
25-Mar-85	850587	0.3	83	0
27-Mar-85	850594	0.2	64	0
28-Mar-85	850595	0.2	86	0
30-Mar-85	850616	0	16	0
31-Mar-85	850617	0.1	29	0
02-Apr-85	850665	0.2	59	0
03-Apr-85	850666	0.5	95	0
04-Apr-85	850700	0.3	109	0
05-Apr-85	850708	0.3	80	0
06-Apr-85	850707	0.3	64	0
07-Apr-85	850717	0.1	39	0
08-Apr-85	850706	0.2	46	0

09-Apr-85	850727	0.2	56	0
10-Apr-85	850726	0.3	66	0
11-Apr-85	850729	0.4	63	0
12-Apr-85	850747	0.3	54	0
13-Apr-85	850741	0.2	38	0
14-Apr-85	850775	0.2	26	0
15-Apr-85	850776	0.7	126	0
16-Apr-85	850806	0.7	72	0
17-Apr-85	850805	0.7	70	0
18-Apr-85	850804	1.6	101	0
19-Apr-85	850816	0.3	74	0
20-Apr-85	850819	0.3	59	0
21-Apr-85	850818	0.2	43	0
22-Apr-85	850817	0.3	29	0
23-Apr-85	850865	0.2	58	0
24-Apr-85	850864	0.5	73	0
25-Apr-85	850860	0.4	61	0
26-Apr-85	850912	0.3	61	0
27-Apr-85	850919	0.1	56	0
28-Apr-85	850911	0.1	28	0
29-Apr-85	850918	0.2	46	0
30-Apr-85	850932	0.1	60	0
01-May-85	850938	0.1	42	0
02-May-85	850931	0.2	72	0
03-May-85	850980	0.4	91	0
04-May-85	850993	0.3	73	0
05-May-85	850992	0.2	61	0
06-May-85	850991	0.3	70	0
07-May-85	851018	0.2	79	0
08-May-85	851017	0.2	62	0
09-May-85	851016	0.3	89	0
10-May-85	851000	0.3	69	0
11-May-85	851001	0.1	50	0
12-May-85	851003	0.2	58	0
13-May-85	851027	0.3	46	0
14-May-85	851041	0.3	102	0
15-May-85	851055	0.4	91	0
16-May-85	851054	0.2	83	0
17-May-85	851079	0.1	53	0
18-May-85	851043	0.2	63	0
19-May-85	851044	0.2	51	0
20-May-85	851075	0.3	61	0
21-May-85	851060	0.2	34	0
22-May-85	851101	0.3	74	0
23-May-85	851100	0.4	95	0
24-May-85	851102	0.4	122	0
25-May-85	851103	0.2	87	0
26-May-85	851113	0.1	76	0
27-May-85	851114	0.2	56	0
28-May-85	851167	0.2	68	0
29-May-85	851156	0.2	64	0
30-May-85	851155	0.1	115	0
31-May-85	851200	0.3	58	0
01-Jun-85	851201	0.1	76	0
02-Jun-85	851200	0.1	58	0
03-Jun-85	851214	0.2	77	0
04-Jun-85	851228	0	82	0
05-Jun-85	851229	0.2	93	0
06-Jun-85	851237	0.2	67	0
07-Jun-85	851235	0.6	125	0
08-Jun-85	851236	0.4	94	0
09-Jun-85	851245	0.1	17	0
10-Jun-85	851246	0.3	104	0
11-Jun-85	851173	0.1	65	0
12-Jun-85	851171	0.1	65	0
13-Jun-85	851273	0.5	96	0
14-Jun-85	851175	1.6	125	7
15-Jun-85	851172	0.5	147	7
16-Jun-85	851174	0.6	149	7
17-Jun-85	851302	0.4	119	7
18-Jun-85	851308	0.3	119	7
19-Jun-85	851309	0.3	137	7
20-Jun-85	851310	0.5	211	7
21-Jun-85	851321	0.6	191	7
22-Jun-85	851326	0.3	97	7
23-Jun-85	851325	0.3	70	0
24-Jun-85	851332	0.3	102	7
25-Jun-85	851384	0.3	87	7
26-Jun-85	851386	0.8	148	0
27-Jun-85	851376	0.2	121	7
28-Jun-85	851377	0.4	201	7
29-Jun-85	851360	*	*	4
30-Jun-85	851367	0.2	113	7
01-Jul-85	851394	0.2	148	0
02-Jul-85	851372	0.6	240	0
03-Jul-85	851370	0.6	279	0
04-Jul-85	851371	0.1	49	0
05-Jul-85	851435	0.2	59	0
06-Jul-85	851437	0.2	81	0
07-Jul-85	851460	0.1	66	0
08-Jul-85	851480	0.3	95	0
09-Jul-85	851486	0.1	135	0
10-Jul-85	851498	0.2	134	0
11-Jul-85	851497	0.1	99	0
12-Jul-85	851562	0.2	114	0
13-Jul-85	851576	0.1	136	0

14-Jul-85	851561	0.1	82	0
15-Jul-85	851564	0.3	100	0
16-Jul-85	851613	0.3	212	0
17-Jul-85	851614	0.2	98	0
18-Jul-85	851622	0.2	65	0
19-Jul-85	851623	0.3	144	0
20-Jul-85	851601	0.2	52	0
21-Jul-85	851628	0.2	52	0
22-Jul-85	851634	0.3	91	0
23-Jul-85	851520	0.3	90	0
24-Jul-85	851650	0.4	49	0
25-Jul-85	851649	*	*	4
26-Jul-85	851672	0.2	105	0
27-Jul-85	851699	0.1	86	0
28-Jul-85	851677	0.1	63	0
29-Jul-85	851686	*	*	7
30-Jul-85	851779	*	163	7
31-Jul-85	851777	*	*	7
01-Aug-85	851778	*	*	7
02-Aug-85	851879	*	*	7
03-Aug-85	851878	*	*	7
04-Aug-85	851877	*	*	7
05-Aug-85	851873	*	*	7
06-Aug-85	851843	*	*	7
07-Aug-85	851844	*	*	7
08-Aug-85	851845	*	*	7
09-Aug-85	851839	*	*	7
10-Aug-85	851827	*	*	7
11-Aug-85	851822	*	*	7
12-Aug-85	851826	*	*	7
13-Aug-85	851814	*	*	7
14-Aug-85	851813	*	*	7
15-Aug-85	851812	*	*	7
16-Aug-85	851807	*	*	7
17-Aug-85	851801	*	*	7
18-Aug-85	851890	*	*	7
19-Aug-85	851891	*	*	7
20-Aug-85	851919	*	*	7
21-Aug-85	851918	*	*	7
22-Aug-85	851917	*	*	7
23-Aug-85	851902	*	*	7
24-Aug-85	851903	*	*	7
25-Aug-85	851904	*	*	7
26-Aug-85	851959	*	*	7
27-Aug-85	851949	*	*	7
28-Aug-85	851948	*	*	7
29-Aug-85	851947	*	*	7
30-Aug-85	851991	*	*	7
31-Aug-85	851992	0.2	110	0
01-Sep-85	851999	*	106	7
02-Sep-85	852030	*	101	7
03-Sep-85	852042	*	*	7
04-Sep-85	852059	*	*	7
05-Sep-85	852056	*	*	7
06-Sep-85	852055	*	*	7
07-Sep-85	852054	0.1	105	0
08-Sep-85	852067	0.1	113	0
09-Sep-85	852068	1.5	245	0
10-Sep-85	852106	0.2	72	0
11-Sep-85	852107	0.2	62	0
12-Sep-85	852108	0.3	73	0
13-Sep-85	852145	0.2	72	0
14-Sep-85	852146	0.1	52	0
15-Sep-85	852147	0.2	74	0
16-Sep-85	852153	0.3	79	0
17-Sep-85	852179	0.4	105	0
18-Sep-85	852178	0.3	72	0
19-Sep-85	852177	0.3	85	0
20-Sep-85	852207	0.2	105	0
21-Sep-85	852206	0.1	75	0
22-Sep-85	852208	0.1	71	0
23-Sep-85	852218	0.1	54	0
24-Sep-85	852252	0.3	65	0
25-Sep-85	852251	0.1	96	0
26-Sep-85	852299	0.1	85	0
27-Sep-85	852298	0.3	92	0
28-Sep-85	852297	0.8	62	0
29-Sep-85	852280	0	20	0
30-Sep-85	852281	0	23	0
01-Oct-85	852310	0.3	84	0
02-Oct-85	842311	*	*	8
03-Oct-85	852804	0.2	83	0
04-Oct-85	852340	0.1	102	0
05-Oct-85	852341	0.3	149	0
06-Oct-85	852332	0.4	119	0
07-Oct-85	852326	0.2	94	0
08-Oct-85	852348	0.3	62	0
09-Oct-85	852349	0.3	57	0
10-Oct-85	852350	0.2	48	0
11-Oct-85	852362	0.3	65	0
12-Oct-85	852360	0.1	58	0
13-Oct-85	852361	0.1	43	0
14-Oct-85	852376	0.1	56	0
15-Oct-85	852392	0.1	55	0
16-Oct-85	852393	0.2	79	0
17-Oct-85	852541	0.2	56	0

18-Oct-85	852399	0.1	27	0
19-Oct-85	852559	0.1	30	0
20-Oct-85	852413	0.1	53	0
21-Oct-85	852417	0.4	88	0
22-Oct-85	852488	0.2	75	0
23-Oct-85	852540	0.1	65	0
24-Oct-85	852496	0.2	74	0
25-Oct-85	852529	0.4	110	0
26-Oct-85	852535	0.2	76	0
27-Oct-85	852528	0.1	52	0
28-Oct-85	852562	0	42	0
29-Oct-85	852569	0	9	0
30-Oct-85	852576	0	24	0
31-Oct-85	852575	0.1	73	0
01-Nov-85	852591	0.2	67	0
02-Nov-85	852592	0.2	84	0
03-Nov-85	852593	0.2	94	0
04-Nov-85	852658	0.5	171	0
05-Nov-85	852665	0.3	109	0
06-Nov-85	852664	0.1	95	0
07-Nov-85	852663	0.3	93	0
08-Nov-85	852668	0.3	91	0
09-Nov-85	852678	0.1	59	0
10-Nov-85	852680	0.1	53	0
11-Nov-85	852695	0.1	45	0
12-Nov-85	852712	0.2	50	0
13-Nov-85	852718	0.1	50	0
14-Nov-85	852719	0.1	46	0
15-Nov-85	852713	0.1	15	0
16-Nov-85	852716	0.3	68	0
17-Nov-85	852691	0.1	20	0
18-Nov-85	852690	0	24	0
19-Nov-85	852798	0.1	43	0
21-Nov-85	852799	0.2	52	0
22-Nov-85	852741	0.2	91	0
23-Nov-85	852740	0.1	60	0
24-Nov-85	852742	0.1	44	0
25-Nov-85	852788	0.2	38	0
26-Nov-85	852853	0.1	39	0
27-Nov-85	852858	0	16	0
28-Nov-85	852859	0	25	0
29-Nov-85	852769	0.1	36	0
30-Nov-85	852770	0.1	26	0
01-Dec-85	852867	0	12	0
02-Dec-85	000000	*	*	10
03-Dec-85	852865	0.2	71	0
04-Dec-85	852930	0.2	79	0
05-Dec-85	852934	0.5	148	0
06-Dec-85	852866	0.3	93	0
07-Dec-85	852950	0.2	110	0
08-Dec-85	852949	0.2	79	0
09-Dec-85	852948	0.1	48	0
10-Dec-85	852974	0	22	0
11-Dec-85	852961	0	14	0
12-Dec-85	852975	0	13	0
13-Dec-85	853036	0	20	0
14-Dec-85	853037	0.1	46	0
15-Dec-85	853020	0.1	47	0
16-Dec-85	853028	0.6	202	0
17-Dec-85	853012	0.5	170	0
18-Dec-85	853013	0.2	75	0
19-Dec-85	853077	0.3	124	0
20-Dec-85	853078	0.4	111	0
21-Dec-85	853079	0.3	99	0
22-Dec-85	853067	0.1	52	0
23-Dec-85	853068	0.2	126	0
24-Dec-85	853093	0.1	33	0
25-Dec-85	853092	0.1	28	0
26-Dec-85	853091	0.1	75	0
27-Dec-85	853086	0.5	70	0
28-Dec-85	853134	0.4	114	0
29-Dec-85	853133	0.3	89	0
30-Dec-85	853132	0.2	84	0
31-Dec-85	853189	0.1	50	0
01-Jan-86	853192	0.2	57	0
02-Jan-86	853188	*	*	4
03-Jan-86	000000	*	*	15
04-Jan-86	860041	0.2	78	0
05-Jan-86	860042	0	38	0
06-Jan-86	860059	0.2	70	0
07-Jan-86	860040	0	66	0
08-Jan-86	860013	0.1	44	0
09-Jan-86	860064	0.3	147	0
10-Jan-86	860065	0.4	237	0
11-Jan-86	860066	0.5	221	0
12-Jan-86	860074	0.2	93	0
13-Jan-86	860075	0.3	271	0
14-Jan-86	860115	0.4	211	0
15-Jan-86	860116	0.4	157	0
16-Jan-86	860114	0.3	49	0
17-Jan-86	860078	0.1	61	0
18-Jan-86	860079	0.2	61	0
19-Jan-86	860125	0.1	101	0
20-Jan-86	860124	0.3	131	0
21-Jan-86	860180	0.1	98	0

22-Jan-86	860199	0.1	68	0
23-Jan-86	860198	0.4	117	0
24-Jan-86	860226	0.6	89	0
25-Jan-86	860225	0.1	68	0
26-Jan-86	860227	0.1	44	0
27-Jan-86	860138	0.5	51	0
28-Jan-86	860240	0.2	95	0
29-Jan-86	860241	0.1	76	0
30-Jan-86	860242	0.3	88	0
31-Jan-86	860236	0.2	83	0
01-Feb-86	860237	0.1	42	0
02-Feb-86	860314	0.1	39	0
03-Feb-86	860316	0.1	28	0
04-Feb-86	860315	0.4	141	0
05-Feb-86	860328	0.1	44	0
06-Feb-86	860329	0.1	25	0
07-Feb-86	860330	0.1	33	0
08-Feb-86	860252	0	15	0
09-Feb-86	860250	0	20	0
10-Feb-86	860251	0	19	0
11-Feb-86	860344	0	32	0
12-Feb-86	860350	0	41	0
13-Feb-86	860345	0.2	62	0
14-Feb-86	860378	0.1	48	0
15-Feb-86	860377	0.1	57	0
16-Feb-86	860376	0.1	54	0
17-Feb-86	860382	0.2	114	0
18-Feb-86	860392	0.3	165	0
19-Feb-86	860488	0.3	161	0
20-Feb-86	860489	0.1	148	0
21-Feb-86	860499	0.1	42	0
22-Feb-86	860519	0.2	89	0
23-Feb-86	860490	0.1	77	0
24-Feb-86	860504	0.2	111	0
25-Feb-86	860522	0.3	176	0
26-Feb-86	860531	0.5	196	0
27-Feb-86	860521	0	55	0
28-Feb-86	860520	0.1	77	0
01-Mar-86	860559	0.2	81	0
02-Mar-86	860558	0.2	81	0
03-Mar-86	860512	0.2	72	0
04-Mar-86	860562	0.2	112	0
05-Mar-86	860561	0.1	134	0
06-Mar-86	860560	0.2	97	0
07-Mar-86	860639	0.2	105	0
08-Mar-86	860625	0.1	79	0
09-Mar-86	860624	0.5	93	0
10-Mar-86	860627	0.1	93	0
11-Mar-86	860660	0.3	122	0
12-Mar-86	860661	0.2	220	0
13-Mar-86	860678	0.1	75	0
14-Mar-86	860677	0.2	72	0
15-Mar-86	860679	0.2	47	0
16-Mar-86	860704	0.1	50	0
17-Mar-86	806718	0.2	78	0
18-Mar-86	860739	0.1	55	0
19-Mar-86	860720	0.1	21	0
20-Mar-86	860721	0.1	58	0
21-Mar-86	860731	0.2	78	0
22-Mar-86	860725	0.3	70	0
23-Mar-86	860727	0.1	49	0
24-Mar-86	860726	0.1	58	0
25-Mar-86	860653	0.2	78	0
26-Mar-86	860655	0.1	72	0
27-Mar-86	860654	0.3	118	0
28-Mar-86	860816	0.3	98	0
29-Mar-86	860804	0.2	97	0
30-Mar-86	860805	0.1	61	0
31-Mar-86	860799	0.2	80	0
01-Apr-86	860783	0.2	81	0
02-Apr-86	860788	0.5	90	0
03-Apr-86	860793	0.2	61	0
04-Apr-86	860879	0.2	66	0
05-Apr-86	860860	0.1	60	0
06-Apr-86	860857	0.1	67	0
07-Apr-86	860856	0.1	99	0
08-Apr-86	860845	0.1	82	0
09-Apr-86	861022	0.1	44	0
10-Apr-86	861024	0.1	60	0
11-Apr-86	861023	0.2	49	0
12-Apr-86	860920	0.2	88	0
13-Apr-86	860921	0.1	73	0
14-Apr-86	860922	0.1	86	0
15-Apr-86	860892	0.1	130	0
16-Apr-86	860855	0.2	81	0
17-Apr-86	860959	0.2	64	0
18-Apr-86	860992	0.2	69	0
19-Apr-86	860991	0.1	67	0
20-Apr-86	860990	0.1	46	0
21-Apr-86	860810	0.1	56	0
22-Apr-86	860813	0.2	58	0
23-Apr-86	860812	0.4	68	0
24-Apr-86	860935	0.1	71	0
25-Apr-86	860937	0.3	64	0
26-Apr-86	860936	0.1	68	0
27-Apr-86	861063	0.1	64	0

28-Apr-86	861079	0.2	89	0
29-Apr-86	861064	0.2	81	0
30-Apr-86	861042	*	*	0
01-May-86	000000	*	*	18
02-May-86	861404	0.2	68	0
03-May-86	861415	0.2	86	0
04-May-86	861414	0.1	76	0
05-May-86	861403	0.1	73	0
06-May-86	861099	0.2	76	0
07-May-86	861090	0.2	94	0
08-May-86	861089	0.2	93	0
09-May-86	861156	*	*	4
10-May-86	861147	0.1	40	0
11-May-86	861153	0.1	57	0
12-May-86	861154	0.2	147	0
13-May-86	861167	0.3	115	0
14-May-86	861174	0.2	114	0
15-May-86	861166	0.3	98	0
16-May-86	861237	0.1	83	0
17-May-86	861236	*	*	9
18-May-86	861227	0	38	0
19-May-86	861229	*	*	9
20-May-86	861266	0.3	106	0
21-May-86	861267	0.4	87	0
22-May-86	861268	0.2	75	0
23-May-86	861283	0.1	81	0
24-May-86	861301	0.1	41	0
25-May-86	861302	0.1	*	0
26-May-86	861300	0.1	43	0
27-May-86	861307	0.1	41	0
28-May-86	861314	0.1	75	0
29-May-86	861308	0.2	110	0
30-May-86	861336	0.2	97	0
31-May-86	861322	0.1	39	0
01-Jun-86	861331	0.1	33	0
02-Jun-86	861329	0.1	55	0
03-Jun-86	861372	0.2	66	0
04-Jun-86	861363	0.2	70	0
05-Jun-86	861362	0.1	40	0
06-Jun-86	861371	0.2	68	0
07-Jun-86	861440	0.1	41	0
08-Jun-86	861463	0.1	50	0
09-Jun-86	861479	0.2	64	0
10-Jun-86	861478	0.1	92	0
11-Jun-86	000000	*	*	15
12-Jun-86	861471	0.2	92	0
13-Jun-86	861472	0.3	88	0
14-Jun-86	861473	0.3	73	0
15-Jun-86	861470	0.1	47	0
16-Jun-86	861506	0.1	72	0
17-Jun-86	861516	0.3	58	0
18-Jun-86	861520	0.3	84	0
19-Jun-86	861521	0.2	76	0
20-Jun-86	861579	0.2	69	0
21-Jun-86	861560	0.2	63	0
22-Jun-86	861536	0.1	51	0
23-Jun-86	861577	0.2	101	0
24-Jun-86	861576	0.2	115	0
25-Jun-86	861575	0.3	134	0
26-Jun-86	861600	0.2	72	0
27-Jun-86	861420	0.1	119	0
28-Jun-86	861601	0.1	122	0
29-Jun-86	861606	0.1	136	0
30-Jun-86	861607	0.2	153	0
01-Jul-86	861597	0.3	148	0
02-Jul-86	861749	0.2	95	0
03-Jul-86	861748	0.2	79	0
04-Jul-86	861746	0.1	101	0
05-Jul-86	861655	0.1	127	0
06-Jul-86	861650	*	*	13
07-Jul-86	861586	0.2	145	0
08-Jul-86	861590	0.2	149	0
09-Jul-86	861783	0.1	147	0
10-Jul-86	861784	0.1	127	0
11-Jul-86	861785	0.2	131	0
12-Jul-86	861822	0.2	154	0
13-Jul-86	861823	0.1	85	0
14-Jul-86	861677	0.1	107	0
15-Jul-86	861676	0.1	140	0
16-Jul-86	861827	*	*	15
17-Jul-86	861833	0.3	106	0
18-Jul-86	861834	0.4	100	0
19-Jul-86	861832	0.3	90	0
20-Jul-86	861884	0.1	76	0
21-Jul-86	861895	*	*	8
22-Jul-86	000000	*	*	15
23-Jul-86	000000	*	*	15
24-Jul-86	861890	*	*	3
25-Jul-86	861894	0.2	91	0
26-Jul-86	861883	0.2	75	0
27-Jul-86	861891	0.1	100	0
28-Jul-86	861924	0.2	121	0
29-Jul-86	861930	0.2	111	0
30-Jul-86	861931	0.1	97	0
31-Jul-86	861932	*	108	0
01-Aug-86	861987	*	*	4

02-Aug-86	861989	0.1	85	0
03-Aug-86	861988	0.1	49	0
04-Aug-86	861963	0.2	68	0
05-Aug-86	861967	0.3	64	0
06-Aug-86	862034	0.2	78	0
07-Aug-86	000000	*	*	15
08-Aug-86	862035	0.1	72	0
09-Aug-86	862021	0.2	65	0
10-Aug-86	862033	0.1	68	0
11-Aug-86	861959	0.2	88	0
12-Aug-86	861958	*	*	4
13-Aug-86	862026	*	*	3
14-Aug-86	862081	0.2	72	0
15-Aug-86	862080	0.1	87	0
16-Aug-86	000000	*	*	12
17-Aug-86	862095	0.1	63	0
18-Aug-86	862094	0.3	126	0
19-Aug-86	862223	0.2	81	0
20-Aug-86	862096	0.2	120	0
21-Aug-86	862224	0.1	99	0
22-Aug-86	862259	0.2	91	0
23-Aug-86	862243	0.2	52	0
24-Aug-86	862244	0.1	34	0
25-Aug-86	862253	0.1	130	0
26-Aug-86	862255	0.2	110	0
27-Aug-86	862254	0.1	64	0
28-Aug-86	862269	0.2	61	0
29-Aug-86	862268	0.2	70	0
30-Aug-86	862270	0.1	80	0
31-Aug-86	862278	0.1	69	0
01-Sep-86	862279	0.1	36	0
02-Sep-86	862277	0.1	51	0
03-Sep-86	862291	0.1	67	0
04-Sep-86	862290	0.1	74	0
05-Sep-86	862289	0.1	46	0
06-Sep-86	862355	0.1	41	0
07-Sep-86	862342	0.1	49	0
08-Sep-86	862341	0.1	64	0
09-Sep-86	862374	0.2	81	0
10-Sep-86	862373	0.1	78	0
11-Sep-86	862375	0.1	73	0
12-Sep-86	862363	0	105	0
13-Sep-86	862362	0.2	73	0
14-Sep-86	862361	0.1	71	0
15-Sep-86	862422	0.2	107	0
16-Sep-86	862433	0.3	103	0
17-Sep-86	862423	0.2	94	0
18-Sep-86	862430	0.2	92	0
19-Sep-86	862458	0.2	69	0
20-Sep-86	862459	0.1	62	0
21-Sep-86	862451	0.1	59	0
22-Sep-86	862452	0.2	67	0
23-Sep-86	862450	0.3	79	0
24-Sep-86	862484	0.2	106	0
25-Sep-86	862483	0.2	105	0
26-Sep-86	862444	0.2	96	0
27-Sep-86	862524	0.1	78	0
28-Sep-86	862525	0.1	53	0
29-Sep-86	862526	0.1	86	0
30-Sep-86	862534	0.2	111	0
01-Oct-86	862532	0.2	113	0
02-Oct-86	862533	0.2	190	0
03-Oct-86	862614	0.1	159	0
04-Oct-86	862616	0.1	55	0
05-Oct-86	862615	0	18	0
06-Oct-86	862602	0.1	21	0
07-Oct-86	862603	0.2	52	0
08-Oct-86	862604	0.2	50	0
09-Oct-86	862668	0.1	73	0
10-Oct-86	862667	0.2	90	0
11-Oct-86	862666	0.1	48	0
12-Oct-86	862672	0	14	0
13-Oct-86	862674	0.1	43	0
14-Oct-86	862721	0.2	83	0
15-Oct-86	862725	0.3	157	0
16-Oct-86	862739	0.3	159	0
17-Oct-86	862701	0.3	126	0
18-Oct-86	862704	0.2	87	0
19-Oct-86	862703	0.1	85	0
20-Oct-86	862709	0.2	129	0
21-Oct-86	862776	0.2	112	0
22-Oct-86	862777	0.3	33	0
23-Oct-86	862763	0.1	16	0
24-Oct-86	862767	0	27	0
25-Oct-86	862768	0.1	56	0
26-Oct-86	862799	0.1	61	0
27-Oct-86	861768	0.2	107	0
28-Oct-86	861767	0.6	113	0
29-Oct-86	861762	0.3	121	0
30-Oct-86	862784	0.3	109	0
31-Oct-86	862785	0.3	131	0
01-Nov-86	862786	0.1	90	0
02-Nov-86	862333	0.1	47	0
03-Nov-86	862320	0.1	77	0
04-Nov-86	862332	0.2	29	0
05-Nov-86	862323	0.2	50	0

06-Nov-86	862322	0.2	99	0
07-Nov-86	862321	0.2	42	0
08-Nov-86	862847	0.3	75	0
09-Nov-86	862843	0.2	55	0
10-Nov-86	862848	0.2	25	0
11-Nov-86	862918	0.2	29	0
12-Nov-86	862917	0.2	31	0
13-Nov-86	862916	0	27	0
14-Nov-86	862908	0.2	48	0
15-Nov-86	862907	0.2	46	0
16-Nov-86	862906	0.1	57	0
17-Nov-86	862924	0.2	173	0
18-Nov-86	862926	0.1	64	0
19-Nov-86	862925	0.3	50	0
20-Nov-86	863076	0.3	75	0
21-Nov-86	863060	0.3	100	0
22-Nov-86	863077	0.2	44	0
23-Nov-86	862999	0.1	25	0
24-Nov-86	862998	0.1	21	0
25-Nov-86	862997	0.1	19	0
26-Nov-86	862987	0.1	31	0
27-Nov-86	862986	0.2	33	0
28-Nov-86	862985	0.2	66	0
29-Nov-86	863143	0.3	87	0
30-Nov-86	863156	0.2	48	0
01-Dec-86	863155	0	55	0
02-Dec-86	863185	0.1	66	0
03-Dec-86	863184	0.1	61	0
04-Dec-86	863186	0.2	100	0
05-Dec-86	863191	0.1	73	0
06-Dec-86	863194	0.1	55	0
07-Dec-86	863193	0	32	0
08-Dec-86	863223	0	13	0
09-Dec-86	863224	0	16	0
10-Dec-86	863250	*	*	3
11-Dec-86	863249	0	36	0
12-Dec-86	863227	0.2	95	0
13-Dec-86	863231	0.2	83	0
14-Dec-86	863281	*	*	3
15-Dec-86	863280	0.1	31	0
16-Dec-86	863276	0.1	83	0
17-Dec-86	863273	0.1	52	0
18-Dec-86	863282	0	21	0
19-Dec-86	863275	0.1	73	0
20-Dec-86	863320	0.2	104	0
21-Dec-86	863322	0.1	74	0
22-Dec-86	863321	0.1	34	0
23-Dec-86	863336	0.1	47	0
24-Dec-86	863328	0.3	114	0
25-Dec-86	863334	0.4	73	0
26-Dec-86	863379	0.1	71	0
27-Dec-86	863378	0.1	61	0
28-Dec-86	863371	0.1	64	0
29-Dec-86	863370	0.1	124	0
30-Dec-86	863684	0.2	150	0
31-Dec-86	862699	0.3	117	0
01-Jan-87	863214	0.1	59	0
02-Jan-87	863415	0.2	97	0
03-Jan-87	863413	0	23	0
04-Jan-87	863439	0.1	31	0
05-Jan-87	863420	0.1	56	0
06-Jan-87	863403	0.2	117	0
07-Jan-87	863404	0.1	43	0
08-Jan-87	863410	0.1	33	0
09-Jan-87	863440	0	24	0
10-Jan-87	863446	*	*	3
11-Jan-87	863444	0.1	47	0
12-Jan-87	863445	0.2	95	0
13-Jan-87	863449	0.2	124	0
14-Jan-87	863450	0.1	38	0
15-Jan-87	863451	0.2	59	0
16-Jan-87	863431	0	7	0
17-Jan-87	863425	0	6	0
18-Jan-87	863432	0	15	0
19-Jan-87	863571	0.1	56	0
20-Jan-87	863572	0.1	43	0
21-Jan-87	863570	0.1	77	0
22-Jan-87	863426	0.1	96	0
23-Jan-87	863427	0.1	102	0
24-Jan-87	863573	0.1	54	0
25-Jan-87	863582	0.1	44	0
26-Jan-87	863593	0.3	92	0
27-Jan-87	863592	0.2	120	0
28-Jan-87	870020	0.2	76	0
29-Jan-87	870039	0.1	137	0
30-Jan-87	870038	0.2	178	0
31-Jan-87	863478	0.1	77	0
01-Feb-87	863477	0.1	40	0
02-Feb-87	863479	0.1	76	0
03-Feb-87	863463	0.2	95	0
04-Feb-87	863467	0.1	95	0
05-Feb-87	863466	0	50	0
06-Feb-87	863464	0	15	0
07-Feb-87	870060	0.1	53	0
08-Feb-87	870079	0.1	30	0

09-Feb-87	870243	0.1	60	0
10-Feb-87	870245	0.1	83	0
11-Feb-87	870244	0.1	80	0
12-Feb-87	870095	0.2	100	0
13-Feb-87	870094	0.1	106	0
14-Feb-87	870096	0.1	55	0
15-Feb-87	870085	0	43	0
16-Feb-87	000000	*	*	8
17-Feb-87	000000	*	*	8
18-Feb-87	870135	0.1	57	0
19-Feb-87	870134	0.1	51	0
20-Feb-87	870000	*	*	8
21-Feb-87	870083	*	44	0
22-Feb-87	870141	0.1	53	0
23-Feb-87	870152	0.2	91	0
24-Feb-87	870084	0.3	31	0
25-Feb-87	870160	0.1	26	0
26-Feb-87	870128	0.1	17	0
27-Feb-87	870171	0.2	27	0
28-Feb-87	870169	0	32	0
01-Mar-87	870168	0.1	96	0
02-Mar-87	870196	0.2	146	0
03-Mar-87	870195	0.3	194	0
04-Mar-87	870194	0.2	156	0
05-Mar-87	870000	*	*	15
06-Mar-87	870188	0.3	166	0
07-Mar-87	870190	0.2	94	0
08-Mar-87	870284	0.1	75	0
09-Mar-87	870189	0.1	78	0
10-Mar-87	870283	0.1	37	0
11-Mar-87	870295	0.2	75	0
12-Mar-87	870294	0.2	152	0
13-Mar-87	870293	0.2	134	0
14-Mar-87	870270	0.1	48	0
15-Mar-87	870269	0.2	123	0
16-Mar-87	870271	0.1	46	0
17-Mar-87	870322	0.1	50	0
18-Mar-87	870261	0.1	99	0
19-Mar-87	870321	0.2	118	0
20-Mar-87	870328	0.1	99	0
21-Mar-87	870327	0.1	78	0
22-Mar-87	870329	0.1	76	0
23-Mar-87	870362	0.1	130	0
24-Mar-87	870363	0	29	0
25-Mar-87	870364	*	*	10
26-Mar-87	870457	0	30	0
27-Mar-87	870458	0.1	58	0
28-Mar-87	870459	0	34	0
29-Mar-87	870440	0	26	0
30-Mar-87	870446	0	32	0
31-Mar-87	870447	0.2	54	0
01-Apr-87	870462	0.1	83	0
02-Apr-87	870463	*	*	5
03-Apr-87	870461	0.4	61	0
04-Apr-87	870488	0.2	52	0
05-Apr-87	870490	0.2	43	0
06-Apr-87	870489	0.2	59	0
07-Apr-87	870475	0.2	90	0
08-Apr-87	870476	0.2	99	0
09-Apr-87	870477	0.2	91	0
10-Apr-87	870538	0.2	94	0
11-Apr-87	870478	0.2	64	0
12-Apr-87	870537	0.2	58	0
13-Apr-87	870531	0.1	86	0
14-Apr-87	870530	0.1	73	0
15-Apr-87	870532	0.2	81	0
16-Apr-87	870611	0.2	107	0
17-Apr-87	870610	0.2	148	0
18-Apr-87	870609	0.1	84	0
19-Apr-87	870597	0.1	69	0
20-Apr-87	870598	0.2	77	0
21-Apr-87	870599	0.1	37	0
22-Apr-87	870590	0.1	58	0
23-Apr-87	870588	0.2	83	0
24-Apr-87	870589	0.2	75	0
25-Apr-87	870655	0.2	87	0
26-Apr-87	870656	0.2	89	0
27-Apr-87	870657	0.3	128	0
28-Apr-87	870679	0.2	140	0
29-Apr-87	870660	0.2	127	0
30-Apr-87	870661	0.2	99	0
01-May-87	870671	0.1	80	0
02-May-87	870672	0.1	85	0
03-May-87	870678	0.1	50	0
04-May-87	870719	*	*	12
05-May-87	870711	0.2	77	0
06-May-87	870710	0.1	40	0
07-May-87	870712	0.1	56	0
08-May-87	870716	0.1	69	0
09-May-87	870650	0.1	80	0
10-May-87	870696	0.2	81	0
11-May-87	870697	0.1	84	0
12-May-87	870739	0.2	73	0
13-May-87	870729	0.1	64	0
14-May-87	870738	0.1	67	0
15-May-87	873779	0.1	62	0